THE physical therapy REVIEW

The Energy Cost of Work — FORD

The Role of the Physical Therapist in Human Factors Engineering — POTTS

The Chronic Frozen Shoulder: Conservative Measures of Mobilization — MURRAY

Rapid Rehabilitation of the Injured Back in an Industrial Environment — BARTHOLOMEW and VERNON

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Case Reports — NOVASIC

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Volume 40, Number 12 **December 1960**

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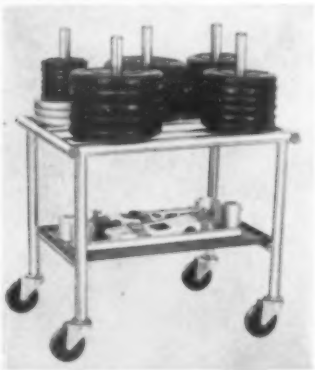

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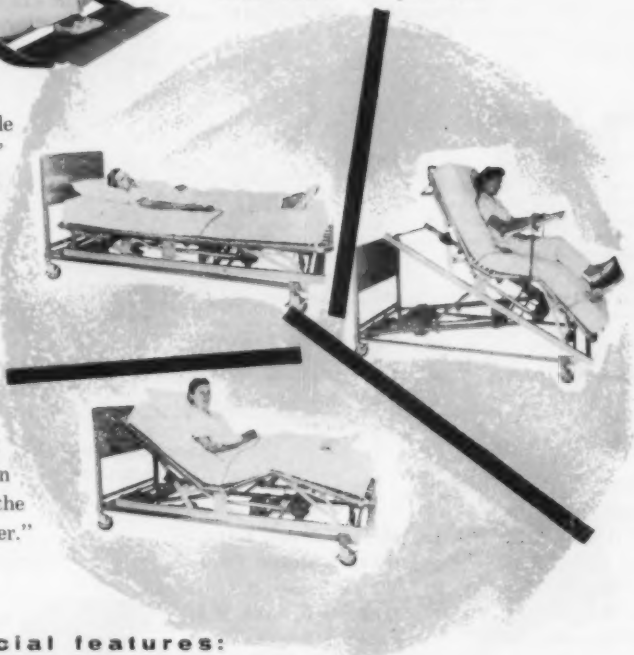

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Physical Therapy Review

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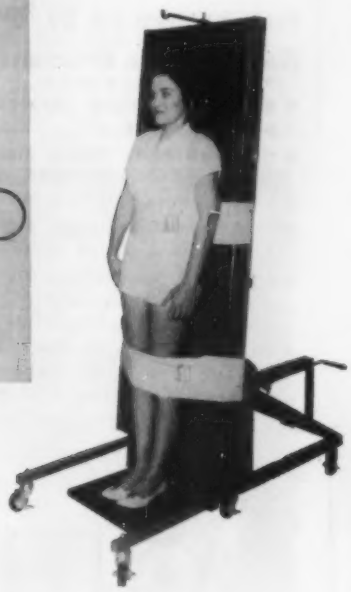

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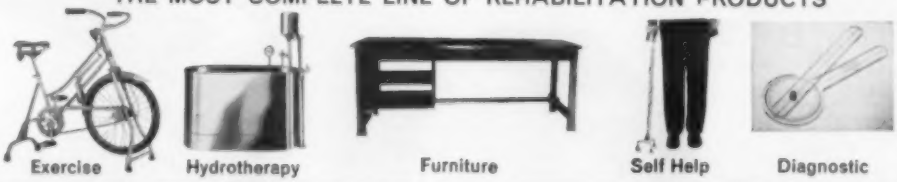

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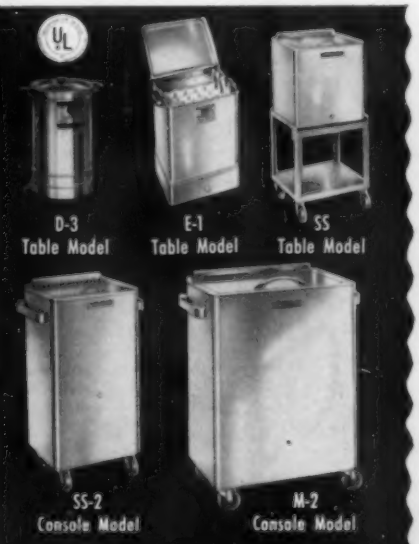

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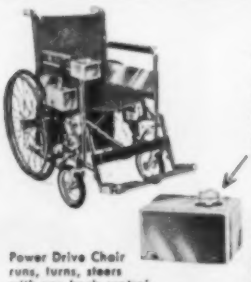

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California*†: Apply to State Board of Medical Examiners, 1021 "O" St., Room A547, Sacramento 14 Examinations held in Los Angeles and San Francisco. SPECIFY REGISTRATION FORM

Colorado*†: Apply to Adelaide Doing, Sec., State Board of Physical Therapy, 4200 E. 9th Ave., Denver 20.

Connecticut*†: Apply to Sarah C. Johnson, Sec., Board of Examiners for Physical Therapists, 436 Capitol Ave., Hartford. Examinations held in Hartford.

Delaware*†: Apply to State Examining Board of Physical Therapists, 302 Waverly Rd., Wilmington 3.

Florida*†: Apply to Homer L. Pearson, M.D., Sec., State Board of Medical Examiners, 901 N.W. 17th St., Miami 36.

Georgia*: Apply to C. L. Clifton, Joint Sec., State Examining Boards, 224 State Capitol, Atlanta.

Hawaii*†: Apply to Department of Health, P.O. Box 3378, Honolulu.

Illinois†: Annual examination, third Friday of October. File applications 15 days in advance. Apply to Judge Vera M. Binks, Director, Department of Registration and Education, Capitol Building, Springfield. Examinations held at 160 No. La Salle St., Chicago.

Indiana: Annual examination. Mid-June. File applications by May 15. Apply to Ruth V. Kirk, Exec. Sec., State Board of Medical Registration and Examination, 538 K. of P. Building, Indianapolis 4. Examinations held at Indiana University Medical School, 1100 W. Michigan, Indianapolis.

Kentucky†: Semiannual examinations, April and October. File application by March 1 or September 1. Apply to Agnes Shehan, Sec., State Board of Physical Therapy, Kentucky Crippled Children Commission, 982 Eastern Parkway, Louisville 17. Examinations held in Frankfort.

Maine: Thrice yearly examinations. Apply to Stephen A. Cobb, M.D., Sec. Medical Examining Board, 34 Winter St., Sanford. March and November examinations held at Portland City Hall, Portland; July examination held at State House, Representative Chambers, Augusta.

Maryland*: Apply to State Board of Physical Therapy Examiners, 301 W. Preston St., Baltimore 1.

Massachusetts†: Semiannual examinations, April and October. File application two weeks in advance. Apply to Board of Registration in Medicine, State House, Boston 33. Examinations held at State House, Boston.

Minnesota*: Apply to State Board of Medical Examiners, 230 Lowry Medical Arts Building, St. Paul 2.

Nebraska*: Apply to R. K. Kirkman, Dir., Bureau of Examining Boards, Room 1009, State Capitol Building, Lincoln.

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New Hampshire*†: Apply to Edward W. Colby, M.D., Sec., Board of Registration in Medicine, 61 So. Spring St., Concord. Examinations held at State Health Building, 61 So. Spring St., Concord.

New Mexico*: Apply to Registrar, Physical Therapists Licensing Board, Box 2206, Santa Fe.

New York: Semiannual examinations; June and December. File applications at least 30 days in advance. Graduates of registered curriculum apply to John W. Paige, Chief, Bureau of Professional Examinations and Registrations, 23 South Pearl St., Albany 7; graduates of nonregistered curriculum apply to Robert C. Killough, Jr., Assistant Commissioner for Professional Education, 23 So. Pearl St., Albany 7. Examinations are held in Syracuse and New York City.

North Carolina*†: Semiannual examinations. Apply to Edith M. Vail, Sec., Dept. of Physical Therapy, N. C. Baptist Hospital, Winston-Salem.

North Dakota*†: Apply to Harriet Deery, Sec., State Examining Committee for Physical Therapists, Crippled Children's School, Jamestown. Examinations held in January and July. File applications one month in advance.

Ohio: Apply to: Herbert M. Platter, M.D., Exec. Sec., Ohio State Board of Medical Examiners, 21 W. Broad St., Columbus.

Oklahoma*: Apply to Lucy Haidek, Exec. Sec., Board of Medical Examiners, Braniff Building, Oklahoma City. Examinations held at Board of Medical Examiners, Braniff Building, Oklahoma City.

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Virginia†: Semiannual examinations, February and September. Apply to Russell M. Cox, M.D., Sec., State Board Medical Examiners, 509 Professional Bldg., Portsmouth. Examinations held in Richmond.

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Wisconsin*: Thrice yearly examinations, April, Mid-September and at the discretion of Examining Committee. File applications at least two weeks in advance. Apply to Emma Zitzer, Sec., Physical Therapy Examining Committee, 207 North Brooks St., Madison 5. April examination held in Milwaukee; September examination held in Madison.

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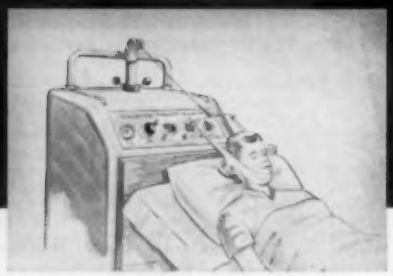

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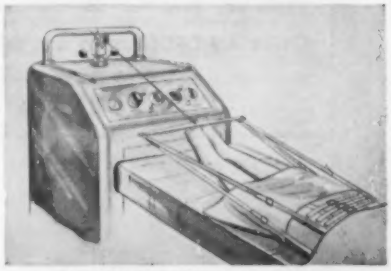

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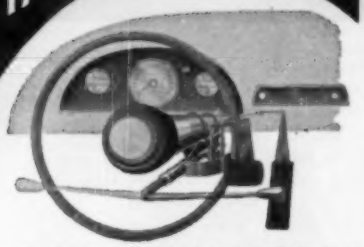

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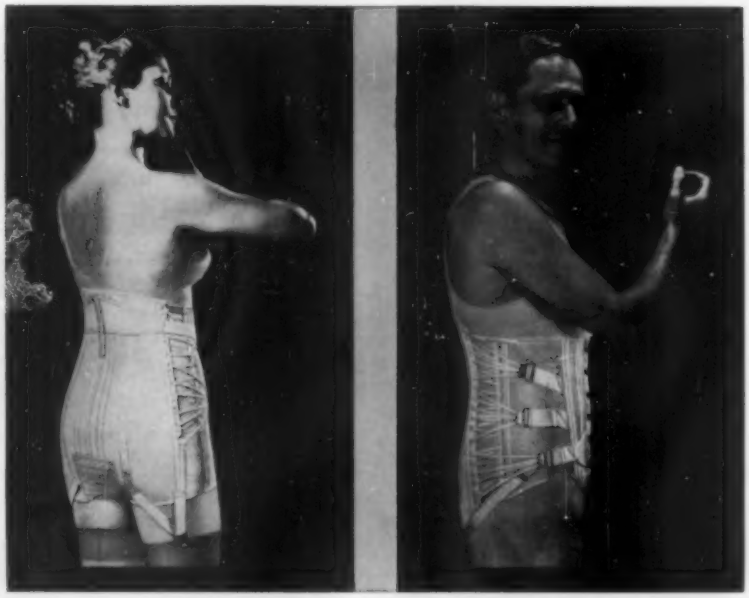

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The Energy Cost of Work

Amasa B. Ford, M.D.*

In his brilliant defense of the scientific view of life, the great renal physiologist, Homer Smith, says: "We live in a river of free energy that tends to flow from a higher level to a lower one. The living organism is an arrangement of matter engaged in absorbing, storing, and spending a little of this energy. By doing so, it seems to swim against the major stream."

Physical therapy is directly concerned with the process of spending energy in the most efficient and constructive way possible.

The first question we must ask, in approaching a problem scientifically, is how to measure its most important characteristics. In considering physical therapy, therefore, we must determine how to measure the energy expenditure of the human body. One obvious method would be to measure the consumption of fuel, that is, a dietary survey of calories consumed. If you have ever had experience with such a survey, however, you will recognize how odd and unpredictable the behavior of otherwise normal people can be when it comes to food. Besides, food intake gives us only the most general kind of average and says nothing about brief or individual activities. We can also measure the total heat and mechanical energy produced by the body, but this becomes a complicated laboratory study. Fortunately, the body uses oxygen to burn food as a flame burns fuel; and measurement of oxygen consumption, therefore, gives us a simple way of measuring energy expenditure, even during brief periods.

German work physiologists have developed a simple, lightweight, portable oxygen meter which has made it possible to move the study of energy expenditure out of the physiology laboratory and into wards, physical therapy departments, and even homes and factories. As a result, we have a reasonably complete and detailed knowledge of the energy costs of most of the ordinary activities.

We speak of energy expenditure in terms of large calories or kilogram-calories. The metabolic rate of the average human being at complete rest is a little over one calorie a minute, or about 1800 calories in 24 hours. Physical activity increases this rate of energy expenditure, according to the position of the body, namely: sitting, standing, walking or climbing, and according to the size of the muscle mass involved—roughly classified into arm work, leg work, and work involving the whole body. A few strenuous occupations, such as hand coal-mining and lumbering, lead to a 24-hour energy requirement of 5000 calories; but the great majority of modern occupations require only 2000 or 3000 calories during a complete work day.

Dr. Herman Hellerstein and I have studied the energy expenditure of men, with and without heart disease, at work in Cleveland factories and steel mills. We found that workers in light-metal manufacturing plants, typical of those which employ a third of the working population of Cleveland, expended an average of 2 calories a minute. This is a low rate, quite comparable to that observed during non-working activities. Even in

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the steel mill, we found only one job, that of first helper on the open hearth furnace, which required more than 3 calories a minute. It was noteworthy that the men with heart disease did not respond differently from their healthy coworkers in terms of blood pressure, pulse rate, ventilation, or electrocardiogram, all of which we monitored as they worked. Resting energy expenditure is a little over one calorie a minute. The average of five calories a minute represents the maximum which a healthy man can maintain throughout a work shift, day after day, without weight loss. Only very few jobs, represented here by coal miners, approach this level. Far more typical of our modern automated society are the desk and factory workers, who work at rates no more than twice the resting level. It is probably not far from the truth to say that most Americans now expend more energy during their non-working hours than they do on the job.

Now, it is important to distinguish between the average energy cost of a day's work and the much more variable costs of the individual activities which make up this work. In comparing the patterns of activity characteristic of a sedentary job such as that of a planning clerk, with those of a fireman in a factory boiler-room, two characteristics are evident. First, the less vigorous activities of the planning clerk tend to be carried out in larger blocks of time, while the few moderately heavy activities of the fireman are performed for only a few minutes or seconds at a time. The second point is to re-emphasize that even the peak activities in modern industrial jobs are not very strenuous in terms of energy expenditure.

Let us consider briefly the energy costs of some familiar activities, in order to get an idea of the relationship of physical therapy to other activities. A general but serviceable classification can be based on the familiar activities of walking and stair climbing. Activities less strenuous than walking, which requires about 5 calories a minute, can be classified as light. Those more strenuous than walking, but less strenuous than climbing and descending stairs (approximately 7.5 calories a minute), may be called moderately heavy, while any activity more energetic than this rates as heavy. Table 1 summarizes some activities of daily living and certain activities which may be performed during occupational and physical therapy. It may be noted that the light activities are primarily those involving the upper extremities, while the moderately heavy and heavy activities bring in the lower extremities and trunk muscles in varying proportions.

It is generally known that prodigious physical

TABLE 1. ENERGY COSTS OF INDIVIDUAL ACTIVITIES

	Activities of Daily Living	*Occupational & Physical Therapy*
LIGHT	sitting	leather work
	standing	chip carving
	transfer bed-chair	weaving (loom)
	washing	operating printing press
	dressing	filing metal
	driving car	handsawing hardwood
	WALKING (5 Calories a minute)	
MODERATELY HEAVY	making beds	straight leg-raising
	mowing lawn	swimming sidestroke
	gardening	golf
	CLIMBING AND DESCENDING STAIRS (7.5 Calories a minute)	
HEAVY	shoveling snow	deep knee bends
	wood chopping	pushups
	running	competitive sports

feats can be accomplished by young men with amputations and paralyses who are otherwise healthy. Even in these well-motivated individuals, however, the loss of active muscle sets a limit to total energy expenditure which is below that of their intact contemporaries. Other factors are present in many physical therapy patients, such as age, enforced inactivity, excessive weight, and the use of an unnatural gait, all of which have been separately demonstrated to reduce the maximum level of energy expenditure.

At two Cleveland chronic disease hospitals we measured the energy expenditure during assisted ambulation of 20 elderly patients convalescing from hip fractures. They walked with crutches, parallel bars, or walkers, and their average energy expenditure was 2.8 calories a minute. This is, of course, substantially less than the aforementioned figure of 5 calories a minute for the energy cost of walking—by healthy young adults at about three miles an hour. Even at this reduced rate of progression and energy expenditure, some of the patients showed marked increases of blood pressure or pulse rate. This fact suggests that they may have been operating close to the limits of their energy reserves.

Relative to the remarkable feats which young paraplegics can perform, Dr. Edward Gordon has studied a group of these patients, in terms of energy expenditure. He found that in crutch walking with a swing-through gait, the patients expended energy at about the same rate as healthy young people engaged in walking—that is, at about five times the resting rate—but that this rate was close to the maximum for about half the patients, as evidenced by the formation

of large oxygen debts and the excessive accumulation of lactic acid in their blood. In addition, of course, the patients' rate of forward movement was much less than that of the normal walkers. He put this vividly in the statement, ". . . in some patients, a swing-through gait on a continuous basis produced exhaustion analogous to that of a normal individual performing a 440-yard run." Dr. Gordon then goes on to question, as I do, whether the extreme efforts (which have sometimes been made in the past) to get every possible paraplegic to walk are realistic.

Age is a second factor which further limits a maximum energy expenditure, already reduced by loss of active muscle. A healthy untrained young man can increase his energy output about 15 times on a treadmill. A group of healthy men in their sixties and seventies on the other hand, have been able to reach a maximum of about 10 times the resting rate. The elderly subjects we observed were performing at only three times their resting rates. Several of them felt that this was close to their limit; and I am inclined to believe them, since, in addition to their average age of 75 years, these individuals had various manifestations of arteriosclerosis, diabetes, osteoarthritis, and the effects of enforced activity.

I do not want to give the impression that even minimal activity is too much or dangerous for these elderly and chronically ill patients. On the contrary, I believe that appropriate exercise is one of the most effective therapeutic measures we have. What I do wish to suggest is that every patient who comes to the physical therapy department, or is seen in the hospital or at home, has a different exercise tolerance. It may be above average, as the result of training and strong motivation, or, more likely, it may be limited by age, disease, or inactivity. Starting with the concept of how relatively light or heavy a given activity is for the average, normal individual, and taking into account the characteristics of a particular patient, it then becomes possible to make highly individualized judgments of the appropriateness of an activity for a given patient.

The energy expenditure of a particular activity is not, of course, the only measure of how "hard" it is. I have already mentioned pulse rate, blood pressure, and pulmonary ventilation as other indices of the strain on the cardiovascular system.

The rate at which the heart pumps blood is an important factor in considering the strenuousness of a given activity. Cardiac output does not always run parallel to oxygen consumption, although they usually change in the same direction. Dr. Frederic Kottke and his associates at the University of Minnesota Medical School have studied both factors in relation to body position, and have found that the lowest levels of cardiac output were observed when subjects sat quietly, well-supported in an arm chair. The demands on the heart were less in any position in which the legs were dependent. Activities requiring use of only the hands were found to increase cardiac output very little. Activities requiring arm support or effort for shifting, or balance of the trunk, require a greater cardiac output. The greatest cardiac stress occurs when the body is lifted.

Recent laboratory studies by Sarnoff and others have shown that the amount of oxygen used by the heart itself is related to both heart rate and blood pressure, especially affected by emotions, such as anger and anxiety, and certain environmental conditions, such as heat and humidity. We have found in our industrial studies that these influences may at times obscure those of physical activity alone. Heart rate has often been used as a general index of the severity of a given activity. It is particularly valuable in comparing an individual with himself—in fact the pulse rate following a standard activity might serve as a simple index of the progress of a patient in physical therapy. But in using pulse rate, it is important to recognize its limitations and to remember the many complex physiologic reactions of which heart rate is only a part. We know very little as yet of the effect of physical activity on the output of hormones and the subtle interplay of these forces with those of the central and peripheral nervous systems. But the little we do know indicates that these regulatory mechanisms are very important in determining how work is performed and how this performance, in turn, affects the body.

And then we cannot overlook the psychologic aspect of physical activity. After describing how Tom Sawyer got his friends to paint the fence for him, Mark Twain comments, "Work consists of whatever a body is obliged to do, and Play consists of whatever a body is not obliged to do." And Robert Frost observed, "The world is full of willing people, some willing to work, and the rest willing to let them." All the psychologic connotations of physical activity, of course, are not necessarily negative. The increased capacity to perform, which results from training, depends upon and, in turn, reinforces the patient's desire to help himself. In working with patients with heart disease, I have often been struck with the excitement which lights up a patient's face when he first discovers that he can perform a simple step test. It is not easy to distinguish between

this kind of psychologic lift and true physiologic improvement; this is an area for more intensive study.

SUMMARY

We possess the means to describe human activity in terms of energy. Thus, we can classify both individual activities and daily work, according to how much energy they require. We have found in factories and mills, that few modern city jobs call for more than twice the resting rate of energy expenditure, and that we probably spend more energy at leisure than at work.

Activities of daily living and physical therapy require more energy for the disabled individual to perform, and his reserves tend to be smaller, so that every patient's capacities and goals must be individually determined.

And, finally, work and exercise have a value for the body and spirit of man which we must constantly seek to understand and use.

*The Role of the Physical Therapist in Human Factors Engineering**

Pauline Potts, Captain, USAF, MSpC

Human engineering is such a new field that many different terms can be used with various degrees of precision. For example, human engineering may be referred to as engineering psychology, psychometrics, biomechanics, human factors in equipment design, or other types of engineering or psychology. However, basically, the aim of human engineering is to make the best use of the abilities that today's human being possesses. Human engineering is engineering for human use.

Many professions are represented on human engineering staffs. These include anthropologists, sociologists, physiologists, psychologists, mathematicians, electrical engineers, time and motion engineers, aeronautical engineers, physicians, and others. The few instances when the physical therapist has been given the opportunity to participate in the solution of human engineering research problems are as follows:

(1) development of amputee prosthetics, (2) evaluation of the placement of handicapped persons in industry, and (3) muscular evaluation of crews of high performance flight vehicles. The physical therapist has a rightful place in human engineering.

Up to the present time the largest proportion of human engineering research has been accomplished by civilian airlines, military personnel, and industries associated with the production of commercial aircraft. Therefore, the bulk of the literature consists of research on factors pertaining to flight and aircraft design. However, the results of such research can be applied by many other professions and industries.[1]

This paper represents the personal viewpoint of the author and is not to be construed as a statement of official Air Force policy.

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During this century the aircraft industry has experienced a tremendous requirement for human engineering. At one time airplanes attained a maximum speed of 40 miles per hour. Now they can fly at supersonic speeds, and engineers are building them to fly faster and longer distances. When manned aircraft operate at supersonic speeds, the design of each airplane and the determination of its capabilities must be gauged to the crew's capabilities. Radar units can be compelled to control thousands of airplanes, but they may exceed human capabilities for safe operation. Similarly, highly complex machines can be produced for industrial use, but if men cannot operate them accurately, they are of no advantage to industry. In other words, the complexity of the machine must be geared to the capabilities of the human operator.

Time and motion studies are an integral part of human engineering, if the results are to be applied to work problems. These studies should be considered in the design of controls, their location, the size and arrangement of the work area, and the amount of motion as well as the degree of muscular force required to operate the controls. For example, the lowering of some gauges makes it possible for them to be operated by pronation and supination with minimal movement of the shoulder.

Time and motion studies have been conducted in almost all phases of industry for the purpose of determining the optimal method by which the human operator can perform a variety of movements or tasks that range in complexity from the folding of a letter and the use of a wet mop to the operation of a highly complex electronic machine. Selection of the best method takes into account the speed with which the task can be accomplished, the fatigue experienced by the operator, the output, and the accuracy.[2]

The principles of motion economy with which physical therapists are familiar, and which they use daily in the treatment of patients, have evolved from time and motion studies. In an exercise program therapists use free, smooth, continuous curved motions. Therapists also know the value of rhythm in movement and the utilization of the effects of gravity. Industry uses these same concepts, which are of considerable importance in both the design and the location of the controls in an aircraft cabin. If, during the operation of controls, a momentary hesitation in motion is observed, the entire procedure must be analyzed, its cause must be identified and, if possible, eliminated. This might be accomplished by changing the height of the control, by moving it to the right or left, or by changing the design of the control.

Some of the results obtained from testing many normal subjects performing varied tasks in regard to work situations are of interest to physical therapists. They are the following:

1. "Control force greater than 30 to 40 pounds applied by hand, and greater than 60 pounds by foot, is fatiguing." [3]
2. "Maximum forces can be applied to levers gripped at shoulder level for the standing operator, at elbow level for the seated operator." [3]
3. "Handles for cranks should be about 1½ inches in length by ½ inch in diameter for operations requiring fast wrist and finger movements, 3¾ inches in length by 1 inch in diameter for operations requiring arm movement of heavy loads." [3]
4. "Push is greater than pull for side-to-side motion, with 90 pounds about maximum." [3] [Elbow flexed to 90 degrees]
5. "Pull is greater than push for elevator-type controls. Pull is greater from a sitting position than from the standing position." [3] [Elbow flexed to 90 degrees]
6. "Momentary pull [for the arm] can be as great as 250 pounds, while maximum steady pull is only about 65 pounds." [3]
7. "Leg strength is second only to postural strength. Force in stretching is greater than in bending. Maximum force of legs using a back support is approximately 450 pounds for short periods. Throw-off (point at which leg ceases to function alone and other body components begin to operate) occurs around 40 pounds with no back rest and 60 pounds with back rest." [3]
8. "Leg and arm strength reach their maximum around the age of 25 years and decline about 50 per cent from 30 years to 65 years. Hand strength will decline about 16.5 per cent." [3]
9. Right hand dynametric power (average steady pull) is 85 pounds, left hand 77 pounds. Right hand can exert an average of 10 pounds greater force.
10. Lifting power of back and arm component is 295 pounds.
11. Lifting power of elbow components in extensor muscles is 48 pounds and flexor muscles 60 pounds.
12. Horizontal movement of the hand is faster than vertical.
13. Controls which must be operated from a fixed operator's position should be within an arc of 28 to 30 inches measured from the individual's shoulder position.
14. For braking or rudder operations, the angle between the upper and lower leg should be within the range of 105 to 135 degrees—110 to 120 degrees being judged the most comfortable.
15. Push buttons should not require extreme pressure to operate—maximum around 30 pounds.
16. A 10-second rest period between repetitive movements produces less fatigue than a faster series of repetitive movements followed by a longer rest period.[4]
17. Margin of error is less when controls move in the same direction as that which is being moved.[5]

These findings are equally important in industry, manned flight, and medicine. Some principles are important in the actual treatment of patients, and others should be applied to the design of the area in which the patients are treated.

In many other areas the concepts in medicine and engineering overlap considerably. For example, ski bindings might never have been improved by manufacturers if so many skiing accidents had not occurred. Design engineers for ski bindings, in cooperation with physicians, determined why a fracture occurred repeatedly in a particular area of the ankle, fibula or tibia; and the bindings were modified to eliminate the problem.

When an aircraft accident occurs, an investigation team visits the scene to learn the cause. Among the members of this team will be a flight surgeon or a physician who has specialized in aviation medicine. These physicians can determine, from the location and type of fracture or from the location and type of herniaton, where the force of the impact occurred. Then they work with the design, aeronautical, and mechanical engineers to eliminate these focal areas of stress.

Other research is being conducted to improve the operating conditions for pilots. One phase of this research is concerned with seat belts in the aircraft; many improvements have been made and others are anticipated in the near future. Another phase is directed toward the safe ejection of the pilot from the aircraft. When a pilot is ejected from an airplane and parachutes to safety, he may sustain a fractured vertebra. A physician determines whether the fracture was sustained during ejection, at the time of parachute opening, or upon the pilot's hitting the ground. After discovering when the fracture occurred, the physician in cooperation with the engineers makes improvements in either the ejection procedures or the harness of the parachute. In one instance of follow-up research after fracture of a vertebra during ejection, it was concluded that the lower back is the region of the body most vulnerable to injury during seat ejection. It was found that the use of arm rests during ejection would permit the arms to carry 12 per cent to 28 per cent of the body mass during accelerations up to 16 g. (g is a symbol used in aviation medicine for the unit of force which is exerted upon the aviator's body during acceleration in flying.) This, in turn, would reduce the frequency of back injuries resulting from excessive pressure, of herniated nucleus pulposus, and of compression fractures among pilots and crew members forced to eject.[6]

All phases of ejection have been subjected to research. These efforts have been aimed at determining such aspects as the optimal position and the support required for the head in order to prevent cervical strain and fractures. After a study of ejection controls, their location was changed to allow the pilot to keep his arms at his sides during ejection. This development alone has lessened the incidence of fractures of the humerus resulting from the friction of the wind at high velocity and the pattern of the parachute opening, during high altitude ejection.

The research required by day-to-day changes in the aircraft industry and the research performed by brace makers, in preparation for the designing of a prosthesis and a brace, have much in common. The same engineering principle and, frequently, the very same type of metal are used for landing-gear sections and for positioning the upright supports of some long-leg braces.

In human engineering, the physical therapists have a role to play. A definite need exists for their capabilities, and it is their responsibility to prove that they have something of value to contribute to the over-all picture. Inasmuch as human engineering makes optimum use of the capabilities of both man and machine, any discipline that concerns itself with the questions of why and how a man functions can make important contributions to the human factors field.

Human engineering is a must for manned space travel. From experiments which have been conducted, it is known that exercise is one of the important factors for the crew in a confined area and, sometimes, in a weightless environment. These experiments have shown that a tremendous loss of muscle tonus develops after only a few days of weightlessness. The subjects of experiments in a simulated weightless environment require muscle evaluations before and after the experiment. These evaluations should assess both strength and endurance.

The employment of an ever-increasing number of handicapped persons in industry has created a tremendous need for the accurate evaluation of their capabilities. Placement personnel are dependent upon these evaluations in assigning the handicapped to jobs for which they are fitted. When a physician returns an industrial worker to his job, following injury, without fully evaluating his physical capabilities, it is difficult to find a suitable job for him. Placement personnel and design engineers would prefer to receive the person with a statement of the exact range of motion and strength of the involved extremity or part. Then on the basis of this medical evaluation,

sound requirements can be established for the worker, and any necessary change in either the equipment or the design of the work area can be made. Close cooperation of medical and industrial personnel can reduce the amount of money spent each year on workmen's compensation benefits.[7]

Many problems encountered by the handicapped when they seek employment would be eliminated if physical therapists were given the opportunity to evaluate the particular handicaps. However, the evaluation is not the complete solution; the design engineers and the shop foremen must rely on these evaluations. The physical therapist can make a complete evaluation of the motor fitness of an injured industrial worker. This would include the range of motion, the strength, the speed, the endurance, and the coordination required of an individual to perform his job. Rehabilitation of injured workers is an integral part of human factors engineering. It is the responsibility of engineers in cooperation with the medical staff to provide working arrangements that are in keeping with rehabilitated workers' capabilities.

In 1916, a paper was presented by Frank B. Gilbreth, an engineer, and his wife, Lillian M. Gilbreth, a psychologist in which they said:

". . . the problem of the mutilated soldier is really the same problem as that of the worker injured by an accident in the industries, so far as the engineer's particular field is concerned. While the soldier is still wounded or ill, his treatment lies in the province of the doctors, nurses, convalescents' homes, and other agencies for immediate relief. When the soldier is discharged from these as having been healed or repaired—to as great an extent as is possible—securing his usefulness, efficiency and happiness becomes a problem for the engineer, the motion study expert, and for the industries.[8]

". . . many workers can be best provided for by some change that will adapt the work to the man. This may consist principally of rearranging the surroundings, equipment and tools. It may consist of slight modifications of machinery. It may consist of changing the method by which the work is done, that is, of allowing some other member of the worker's body to perform the motions that formerly were made by a member that is now maimed or missing. In any case, the need is for invention."[8]

The human engineering concept was presented many years ago by the Gilbreths, but it still is not used to the extent that it should be. An advance analysis by medical personnel and engineers of all possible design factors in relation to the human requirements would reduce accidents, lower compensation payments, and reduce costs of training personnel. When therapists are given the opportunity to work with other professional groups to increase the productivity of man-machine capabilities, they must accept the challenge. No other professional group is more capable of evaluating the degree of muscular and joint function of both normal and handicapped people than physical therapists. They have a big contribution to make to the smooth operation of the human factors engineering team. The innovation of a human factors group and the application of its findings are becoming more important to all phases of industry and to many of our daily activities. Whenever given the opportunity, therapists should become members of the group.

REFERENCES

1. Celent, C.: Human Factors—newest engineering discipline. Electronics Industries, 19(2): 85-100, Feb. 1960.
2. Mundel, M. E.: Motion and Time Study, Principles and Practice. 2nd Ed. New York: Prentice Hall, 1955.
3. Woodson, W. E.: Human Enginering Guide for Equipment Designers. Berkeley: University of California Press, 1954, pp. 25-31.
4. Chapanis, A., Gardner, W. R., and Morgan, C. T.: Applied Experimental Psychology. New York: John Wiley & Sons, 1949.
5. Vince, M. A.: Direction of Movement of Machine Controls. Cambridge, England: Flying Personnel Research Committee. Cambridge Psychological Laboratory, Ministry of Supply, FPRC-637, 1944.
6. Report TSEAA 695-66G: Experimental Arm Rests on Ejection Seats. Wright-Patterson AFB, Ohio: Aeromedical Laboratory, Jan. 1948.
7. McFarland, R. A.: Human Factors in Air Transportation. New York: McGraw-Hill Book Co., 1953.
8. Spriegel, W. R. and Myers, C. E., Ed.: The Writings of the Gilbreths. Homewood, Ill.: Richard D. Irwin, Inc., 1953, pp. 281-282.

The Chronic Frozen Shoulder

Conservative Measures of Mobilization

William Murray, M.A.

Physiologic function of the arm-trunk mechanism is subject to numerous lesions which often end with severe reduction in its mobility. Successful restoration of motion in the chronically afflicted shoulder region will depend upon an understanding of its changed mechanical characteristics and the judicious application of corrective forces. The term "frozen shoulder" is commonly applied to chronic immobility of the arm-trunk mechanism, particularly the glenohumeral joint.

"Frozen shoulder," a frequently observed clinical entity, is probably synonymous with adhesive capsulitis, periarthritis, and painful contracted shoulder. Although diagnosed readily, the underlying causes are more often obscure. Ghormley[1] cites Codman's findings of causative lesions. These include (1) adhesions in the bursa or between the two layers of bursal membrane and the wall above or below; (2) adhesions between the tendon of the long head of the biceps and its sheath; (3) stiffening and contractures in the musculotendinous cuff; (4) various types of tendinitis and capsulitis that involve the capsule of the joint and extend into the various bursae, which he described as being extensions from the subdeltoid bursa; (5) spontaneous rupture of the tendons, particularly that of the supraspinatus tendon in older persons; and (6) calcified subdeltoid bursitis.

Added to these, Bunnell[2] includes (1) inflammatory states of nerve tissue, particularly from the cervical foramina and distally; (2) conditions interfering with muscle contractility; (3) immobilization of shoulders due to fracture of nearby structures, or lesions of the skin overlying or adjacent to the shoulder and scapula regions; and (4) disabilities involving the hand and elbow.

Bateman,[3] while recognizing the diversity of pathologies which may result in frozen shoulder, states that it most commonly arises as a reaction to degenerative processes of the rotator cuff or bicipital mechanisms and acromioclavicular arthritis. Impaired blood supply and/or adverse mechanical use are the primary contributing factors.

In microscopy of four cases, Simmonds[4] observed that the bursa showed chronic inflammation with hyperemia, the supraspinatus tendon exhibited similar inflammatory changes, and in addition there was focal necrosis and degeneration with marked increases of vascularity. "It must be assumed, therefore," Simmonds states, "that the basic cause of frozen shoulder does not lie in the joint, the biceps tendon, or the subacromial bursa. It is the fixator tendons (rotator cuff) and the capsule that are primarily affected. The whole tendinous cuff has an abnormal appearance, but it is the supraspinatus tendon, which shows evidence of a vascular reaction around areas of degeneration, that is essentially involved.

"The cause of degenerative changes is difficult to determine, but it is probably associated with impairment of blood supply, due to injury of the tendon by impact against the acromion process and coraco-acromial ligament, especially in patients with cardiovascular disease, and at the climacteric, when abnormal and irregular degeneration may be caused by changes in vascularity."

The patient, in his efforts to avoid pain, splints his arm against his side, with the medial forearm resting against his upper abdominal region. The persistence of this pain-avoidance posture encourages the adaptive contractures which produce the clinical frozen shoulder. These changes include the following in varying degrees:[3]

1. The folds of the inferior capsule and synovium become thickened and "glued" together. This normally redundant tissue becomes contracted and comparatively inextensible.

2. The synovium becomes adherent to adjacent cartilage surfaces.

3. The capsule becomes thickened and contracted with marked reduction of the normal joint space.

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4. The rotator cuff is thick and inelastic with tough adhesions attaching it to the overlying bursal margins.

5. The bicipital groove and tendon are "glued" and the synovial lining is partially or completely obliterated.

6. Accessory ligaments are thickened, binding the head of the humerus against the glenoid. In particular, the coracohumeral ligament binds the humerus in internal rotation.

7. The deltoid muscle as well as other shoulder joint muscles undergo atrophy. The infraspinatus and teres muscles are also contracted, resulting in upward rotation of the scapula and stretch weakness of the rhomboid muscles.

8. Overuse of the upper trapezius may produce a shortened myositic muscle, resulting in pain in the neck and supraclavicular region.

Simmonds states, "It is usually believed that the prognosis is excellent and that there is nearly always complete recovery; but this has not been our experience. In a small series of twenty-one patients who suffered from frozen shoulder more than three years ago, only six regained normal function; nine have both weakness of the joint and persistent pain; and six complain either of weakness or loss of movement."

The author's observation based on experience with these patients concurs with Simmonds' observation of universal loss of glenohumeral mobility in all directions. This is contrary to the views of others who point to losses primarily in abduction and external rotation.

The physician's prescription usually includes the following procedures directed toward specific goals:

a) analgesic procedures to raise local pain threshold.

b) induction of greater local blood flow, to aid revascularization of the degenerated supraspinatus tendon, the rotator cuff and capsule, and the subdeltoid bursa.

c) passive motion by mechanical, manual, and electrical means to elongate soft tissues, and with particular reference to freeing or separating the tendon from its pressure points.

d) strengthening of local musculature to improve physiology of the region.

e) engaging the part in graded functional tasks.

Judicious physical therapy, in the opinion of many physicians, is the basis of treatment of this condition. The purpose of this paper is to describe and illustrate procedures of value used by the physical therapist to assist the physician in mobilizing the patient's contracted shoulder. Other factors, including motivation of the patient and use of other physical agents such as ultrasound, thermotherapy, massage, and active exercise, while important, will not be considered within the scope of this paper.

Mobilization is often the most important single component in the treatment of a frozen shoulder. The physical therapist must call upon his keenest judgment in "pacing" the patient's treatments. Learning as much as possible of tissue reactions to forced motions is necessary so as to alter technic and modify the quantity of force and repetitions, according to the patient's response. At the conclusion of a treatment session the patient generally describes the feeling about his shoulder as "weary," "worked out," or "dead." Pain following a treatment session should not last longer than a two-hour period; if pain persists, easing the intensity of force, frequency of repetitions, and the variety of motions are indicated.

MEASUREMENT OF MOBILITY

Initial inspection of the patient should include measuring and recording the mobility of the patient's shoulder by use of a goniometer and tape measure.

1. *Flexion*—the patient is supine, the affected arm is passively carried in a sagittal plane until its motion is felt to be obstructed, or as evidenced by elevation of the patient's thorax. Measurement should be made at this point.

2. *Abduction*—the patient is supine, the affected arm is moved away from his chest wall in a frontal plane until free movement ceases. This test involves scapulothoracic as well as glenohumeral motion. To isolate only the latter motion, the patient is tested in a sitting position. The tester places a fingertip over the inferior angle of the scapula, then moves the humerus outward. As soon as scapula motion is felt to occur, the glenohumeral motion is measured.

3. *External Rotation*—the patient is supine with his elbow on the table about six inches from his chest wall. With his elbow flexed at 90 degrees, the humerus is rotated outwardly to approximate his hand to the table. Measurement is made when motion ceases or when the patient's opposite shoulder moves upward from the table. This method of measuring the external rotation motion is admittedly arbitrary. However, in view of the totality of limitation commonly present, the author selected this technic because of its universal application.

4. *Horizontal Adduction*—the patient is supine with his arm abducted. The patient's arm is moved across his chest, directing the mid-biceps region toward his chin. The angle is measured when motion ceases prior to contact of the arm with the chin.

5. *Horizontal Abduction*—the patient is

supine. This motion is the opposite of horizontal adduction. The elbow should easily reach the table surface. Any deficit should be measured.

6. *Scapula Reach*—the patient is seated, facing away from the tester. A linear measurement is made from the patient's thumb tip (of affected arm) to the opposite scapula at its inferior angle. The affected hand is moved behind the patient's back and directed upward toward the inferior angle. Measurement is made when free motion ceases. Scapula reach requires the combined motions of extension, internal rotation, and adduction.

MOBILIZATION THERAPY

The technics of mobilization therapy are grouped as follows:

Electrical stimulation.
Manual mobilization.
Mechanical mobilization with apparatus.

The order in which these methods are listed is intentional since it seems to serve treatment conditions best. In some patients the use of apparatus before manual mobilization may do quite as well; but electrical stimulation is uniformly best when it is administered as the first phase of a treatment session.

ELECTRICAL STIMULATION

In the earlier stages of treatment, electrical stimulation has its greatest value, for it circumvents much of the involuntary muscle tension created by manual and mechanical methods. Such tension in the muscles controlling glenoid motion often impedes attempts to elongate and separate the faulty connective tissue.

The use of a rapidly surging sinusoidal current is employed to contract muscles acting upon the glenohumeral joint. One pad, 3 inches by 3 inches, is suitable as the active electrode; the indifferent electrode may be about 4 inches by 6 inches. Contractions should be as vigorous as the patient can tolerate. During the first treatment, and in the earlier sessions, lower current strengths may have to be used until the patient is sufficiently accustomed to the sensation produced by the electrical impulses. Pain produced by pulling of tendons in the capsular region will be experienced. The point of pain production is a good level at which to stimulate the muscle groups. These contractile forces exert traction and gliding between tendon and capsule directly, and between synovium and glenoid cartilage through indirect action.

Use of a variety of pad positions is necessary so as to activate muscles having tendons within the glenoid environment. Practice and exploration are invaluable in each individual case. However, a few basic pad locations appear to promote good glenohumeral movements. These are:

1. Active electrode over the middle portion of the deltoid muscle; indifferent electrode over the rhomboid muscles.
2. Active electrode over the anterior portion of the deltoid muscle; indifferent electrode over the infraspinatus muscle.
3. Active electrode over the supraspinatus muscle; indifferent electrode over the infraspinatus muscle.
4. Active electrode over the anterior portion of the deltoid muscle; indifferent electrode over the posterior portion of the deltoid muscle.

After eliciting five to eight contractions, using one combination of pads, another set of pad positions is used for five to eight contractions. The pads should be held in place by the therapist's hands, so that pad positions may be readily changed.

Though most of the benefits of this procedure accrue during the earlier stages of mobilization, electrical stimulation may continue to supplement thermotherapeutics as a "warm-up" to the region in later stages of treatment.

MANUAL MOBILIZATION

In manual mobilization the therapist is required to exercise a high degree of discrimination. He must judge between the two often undiscernible situations of over-stretching and ineffectual stretching when applying force to the contracted structures. The term "over-stretching" implies more than its apparent meaning; for in addition to tears of soft structures (such as those attaching the bursal margins with the musculotendinous junction of the rotator cuff) with concomitant inflammatory reactions, one can also inadvertently over-compress or pinch soft structures, such as the subacromial bursa or its underlying supraspinatus tendon. The causes of overstretching include over-enthusiam and failure to achieve adequate motion in one direction as preparatory to attempting greater motion in another direction. Ineffectual stretching may be due to poor methods of fixation or positioning of the patient, over-cautiousness in applying force, and applying force in wrong directions.

Caudad Traction

The sequence of motions used to mobilize glenohumeral movements have been to a great extent set forth by outstanding investigators of this subject. Mennell states[5] that before any elevating motion (abduction and flexion) can occur, the

FIG. 1. Caudad Traction: Increasing the descent of the humeral head upon the glenoid surface.

humeral head must be capable of gliding inferiorly and posteriorly on the glenoid surface as well as rotating on it. If this gliding motion fails to take place, then the greater tuberosity cannot pass comfortably under the acromial shelf during humeral elevation. To determine gliding of the humeral head, the affected arm is passively abducted and supported at 45 degrees or beyond. A depression just distal to the anterolateral tip of the acromion process should be evident. The prominence of the greater tuberosity in this region, instead of the depression, signifies insufficient downward motion of the head of the humerus in the shallow glenoid cavity. Traction of the long axis of the humerus, caudalward, is therefore indicated.

With the patient supine, the patient's wrist is wedged firmly in the therapist's axilla. The therapist then grasps the distal region of the patient's humerus. This is his active hand. The therapist's other hand is placed into the patient's axilla to fixate the scapula in a cephalad direction. While the fixating hand pushes upward in the axilla, the active hand exerts a gradual pull caudalward through the grip around the lower humerus. This force is augmented by the therapist's axillary grip of the patient's wrist. Pain is seldom produced in the maneuver and control of the impressed force is easily managed (Fig. 1).

External Rotation

Bateman[3] and Watson-Jones[6] consider patent external rotation of the shoulder joint a prerequisite to emphasis of abduction. Bateman describes the relationship of the upper surface of the greater tuberosity and its tendency to impinge upon the lateral border of the acromion process. When sufficient external rotation occurs, however, the greater tuberosity lies posteriorly to the lateral border of the acromion.

With the patient supine, the affected arm is abducted to about 45 degrees, and the elbow is flexed to 90 degrees. The therapist fixates the lower humerus gently against the plinth with one hand. His other hand grasps the patient's wrist and proceeds to carefully "bob" the patient's forearm outwardly. As stated previously, the coracohumeral ligament and its underlying capsule, the subscapularis and pectoralis major muscles, and the anterior portion of the deltoid muscles are the limiting soft structures. If the angle at the elbow remains relatively unchanged, accurate motion will be effected. During the bobbing maneuver the patient's upper arm will be rolling on the table surface and, at or near the limitation of movement, his affected shoulder will press against the table in an effort to turn the glenoid in the direction of the rotating humeral head. An apprehensive patient will involuntarily contract his internal rotator muscles. It will be helpful under these conditions to lift his elbow slightly off the table and apply rapid shaking of the arm and shoulder to relax the internal rotators. Resume the maneuver immediately after the brief shaking procedure. Great care should be used to assure the smoothness of the force applied. Since the leverage is great, danger of over-stretching may easily occur (Fig. 2).

FIG. 2. External Rotation: Patient's humerus rolls laterally as a bobbing force is applied at wrist.

Horizontal Adduction

Another basic motion to be restored is horizontal adduction. Mennell[5] states that the first movement to secure, despite teaching to the contrary, is that of horizontal adduction. An impediment to this movement which involves the posterior structures of the joint will make it impossible for full range of flexion and abduction to be achieved. Since these two movements depend upon backward gliding of the humeral head on the glenoid, the posterior joint coverings must be sufficiently loosened and extensible. With the patient supine, the affected arm is drawn across the body so that the long axis of the humerus is directed at the sternoclavicular joints. The therapist places one hand in the posterior axillary space to fixate the scapula by contact with the axillary border. The active or forcing hand pushes against the posterior surface of the distal end of the humerus. A gentle bobbing technic is employed with pauses interspersed. Fortunately, involuntary tension of the patient's muscle offers little resistance to the maneuver due to the poor mechanical position of the antagonistic muscle groups. The eventual goal is to reach humerus-chin contact. It is important to fixate the scapula adequately in order to stretch the posterior capsule, the scapulohumeral muscles, and to avert over-stretching upon the already weakened rhomboid and middle trapezius muscles. Since mechanical leverage is high, cautious and controlled force is essential (Fig. 3).

Lateral Traction

Traction of the humeral head in a lateral direction is helpful in treatment of the more severe frozen shoulder. This traction exerts counter action to the thickened and contracted capsule, the coracohumeral ligament and the musculotendinous cuff which bind the humeral head firmly against the glenoid cartilage. With the patient supine, his affected arm along his side, the therapist places his lower forearm into the patient's axilla. This serves as a fulcrum. The therapist's active hand grasps the lateral aspect of the humerus distally and pushes the patient's elbow inward toward his rib cage, thus effecting a lateral force upon the humeral head (Fig. 4).

FIG. 3. Horizontal Adduction: Careful fixation of the scapula is a prerequisite to forcing humeral motion.

FIG. 4. Lateral Traction: Pressure of the therapist's interposed forearm against patient's medial arm should be minimized.

Another technic of lateral traction is performed with the patient's arm abducted to at least 60 degrees but not more than 90 degrees. For fixation, the patient grasps the opposite side of the table with his unaffected arm. The therapist uses a two-handed grasp around the patient's wrist and pulls through the longitudinal axis of the affected arm toward his own abdomen. The therapist may increase his stability by bracing one of his feet against a table leg. This technic will stretch the rotator cuff tendons, the underlying capsule, and the tendons of the humeral adductors. Many patients have difficulty in relaxing the muscles of the involved shoulder during this maneuver. It is essential, however, that this be achieved or else all traction efforts will be ineffectively expended upon the powerful fixating muscles. In the earlier stages this movement may evoke pain with even the gentlest of forces applied; a cautious approach is a wise one (Fig. 5).

Flexion

Forcing shoulder flexion requires that the patient be supine. The therapist grasps the patient's

FIG. 5. Lateral Traction: The force is effected by the therapist's shoulder extensors and elbow flexors rather than backward trunk motion.

FIG. 6. Flexion: Technic of stretching posterior scapulohumeral muscle groups.

arm just above the elbow at its posterior aspect. For fixation, the therapist's other hand is placed so that the axillary border of the patient's scapula is prevented from excessive abduction and upward rotation. Forcing flexion in this manner elongates the scapulohumeral muscles which are typically shortened. During the patient's attempts of active flexion and abduction these "tightnesses" account for the absence of "separateness of motion" between the glenohumeral joint and scapulothoracic motion. Once a moderate degree of loosening of these structures occurs, the therapist's fixating hand may then be applied to a position over the surgical neck of the humerus. With this point of fixation, pressure in a postero-inferior direction will so guide the head of the humerus upon the glenoid surface. As noted previously, this motion is normal during shoulder flexion; any lack of it will impede full flexion despite the patency of the humeral head rotational motion. Because mechanical leverage is high, the forcing hand must be sensitive to the slightest "giving way" of the soft structures. The therapist's ability to stop his force abruptly is essential (Fig. 6).

If a clicking phenomenon is heard or "felt" during these flexion movements, an effort should be made to avoid them if possible via a change in angles of motion or increased fixator pressure over the humeral neck. Such periarticular sounds seem to arise from the subacromial region, and may involve friction between the upper surface of the subacromial or subcoracoid bursae and the overlying coracoacromial ligament. However, if this phenomenon occurs after 110 to 120 degrees of flexion, the acromioclavicular joint may be suspected. Palpation of this joint during flexion will often confirm this.

Quite often nociceptive tension develops during forced flexion movements. Use of "shaking" technics and momentary pauses will be of some help in gaining relaxation. It is also helpful to ask the patient to attempt in assisting the movement being forced, in order to reflexly inhibit tension in the antagonists. This, however, is usually most difficult as the point of connective tissue resistance and pain is reached.

Horizontal abduction

To mobilize horizontal abduction, the supine patient lies at the extreme edge of the table with the affected shoulder just beyond the table edge. Fixation is in a downward direction with pressure over the lateral portion of the opposite clavicle and the acromion. The patient's arm is abducted and the therapist's active hand grasps the patient's flexed elbow. The gentle bobbing force directs the olecranon in an arc downward toward the floor. In the earlier stages it may not be possible for the humerus to be guided through a horizontal plane in its outward path, but this goal should be worked toward during subsequent sessions. This maneuver provides another path through which the anterior capsule, the coracohumeral ligament, and the subscapularis and pectoralis major muscles may be elongated. Leverage is great; therefore a carefully modulated bobbing force is important.

Internal Rotation

In this movement there is marked difficulty in

fixating the scapula when using conventional methods. The author has attempted to achieve internal rotation in the following manner: With the patient supine and lying at the edge of the table, the patient's hand is placed on his anterior iliac crest with the web of his thumb in the usual akimbo position. The therapist places one of his feet on a footstool so that his anterior thigh supports the patient's elbow. One fixating hand presses downward over the anterior region of the patient's acromion and clavicle. The other fixating hand is placed over the patient's hand. The mobilizing force is accomplished by the therapist's gradual raising of his heel off the footstool surface. This produces an upward force against the patient's elbow, effecting internal shoulder rotation. Care should be exercised to avoid the patient's medial epicondyle from resting painfully against the therapist's knee (Fig. 7).

FIG. 7. Internal Rotation: The fixating hands of the therapist must permit motion to occur at both the patient's wrist and glenohumeral joints.

Abduction

As in the instance of forcing shoulder flexion, there are two variations which the fixating hand may perform during abduction. While the active hand grasps the lower medical third of the patient's humerus, in order to force the abduction motion, the fixating hand may either impede the lateral motion of the axillary scapula border, or it may force the humeral head to glide inferiorly on the glenoid surface. No posterior force need be exerted here as in the case of flexion. When appreciable scapular motion occurs before 30 degrees of abduction takes place, then the former fixating position should take preference. Thereafter, use of both technics during a session appears to be helpful.

Scapula Reach

This motion combines varying degrees of shoulder extension, internal rotation, and adduction. With the patient seated, facing away from the therapist, the affected hand is carefully placed so that its dorsum rests against the patient's ipsilateral gluteal region. The active hand of the therapist is placed around the patient's wrist so that his palm is against the dorsal surface of the patient's wrist. The fixating hand is placed against the anterior region of the patient's unaffected shoulder. Fixation is effected by restricting forward trunk flexion during the maneuver. The active hand produces two separate forces at different moments. Moving the patient's hand diagonally upward toward the inferior angle of the contralateral scapula is the first of these forces. When maximal motion has occurred, that is, at the point of pain, the second force is applied. This consists of gently bobbing the patient's wrist away from the lumbar region.

Due to the exquisite sensitivity of the frozen shoulder to this movement, the distance of wrist bobbing should never exceed one inch until patient-tolerance is fully appreciated by the therapist. It is a most painful maneuver for the patient and, consequently, the use of delicate force is imperative. During the earlier phases of treatment, five repetitions of this procedure will suffice.

MECHANICAL MOBILIZATION

The use of apparatus to encourage increased mobility has been well established. However, a number of conventional technics have disadvantages which are not often modified to the particular needs of a patient. The use of pulley apparatus will be considered first. In the usual sitting position with the pulley attached above the patient's head, shoulder flexion is attempted. *However, this arrangement fails in three ways in its lack of provision for:*

1. stabilization of the scapula to avoid excessive abduction-upward rotation movement. (The use of an inelastic belt, which is attached to the chair and bound over the patient's affected acromion process, will impede scapular motion. Padding between the belt and the shoulder will increase comfort.)

2. a force to depress and push rearward the humeral head. (Midway through pulley motions,

the patient should maintain his affected arm in an elevated position. The therapist may then place a forcing hand over the upper end of the humerus on its anterior aspect. His other hand is placed under the olecranon. In a gradual, even manner, the therapist produces a downward-backward force upon the humeral head while lifting upward by his grip on the olecranon. The patient is also asked to pull on the handle of the pulley with his opposite hand to assist the lifting motion. Two or three repetitions of this particular force may then be followed by the reciprocal movements.)

3. the patient's tendency to lean backward and extend the spine in order to lessen the motion directed at the glenoid joint. (The patient should be seated with his sacrum in contact with the back of the chair. Advising the patient to maintain this position and supervising him will usually suffice.)

The overhead pulley device is also useful to mobilize scapular reaching. In this instance the patient assumes the standing position beneath the pulley. The pulley rope to the affected arm is passed behind the patient's shoulder, then between the arm and chest wall and forward so that the handle is grasped with a palm-down position of the hand. This hand is then placed behind the ipsilateral femoral trochanter. When the force is applied by the downward pull of the uninvolved arm, the patient will flex his thoracic spine in an effort to turn his glenoid in the direction of humeral motion. Ask the patient to resist this tendency as much as he possibly can. However, it is a self-limiting motion and will not nullify the effectiveness of the force.

Mobilizing external rotation by means of pulley apparatus is not a usual procedure. Reasonably good effects have accrued from the following method. A pulley and rope are attached to a wall at table height and about ten inches to the side of one corner of the plinth. The patient lies supine with the affected shoulder at the pulley side. The involved arm is then abducted to approximately 60 degrees, if possible, and the elbow is flexed to 90 degrees. The patient is told that elbow flexion must be maintained throughout the movement. One handle is then placed into each of the patient's hands. By pulling the uninvolved hand caudally, the affected shoulder is externally rotated. The patient using this technic may often neglect returning the affected arm from the maximal position; the therapist should advise him to do so. Also, there is a tendency for the patient to over-pull on this motion; cautioning the patient to "go easy" in his efforts may be necessary.

Finger ladder-climbing to produce shoulder flexion and abduction is a well known activity. With respect to the patient with a frozen shoulder, however, two cautions in its use should be observed. One is the excessive scapular gliding upon the thoracic wall which occurs because of shortened scapulohumeral muscles. This activity should be used only after reasonably good relief from these contractures has been achieved. Another ineffectiveness of the finger ladder is that it does not produce a downward force upon the humeral head during elevation exercises. Here again, use of the ladder should be deferred until the anterior and inferior capsule and the coraco-humeral ligament have been sufficiently loosened so as to allow for the very important gliding motion.

SUMMARY

A brief review of the etiology and pathology of the frozen shoulder syndrome has been presented. Following this, methods of mobilization were described. These methods included electrical stimulation, manual and mechanical technics. In view of the complexity of glenohumeral and scapulothoracic physiology of motion, an attempt was made to delineate in some detail the methods and sequence of their use to restore flexibility of the shoulder.

REFERENCES

1. Ghormley, R. K.: The Stiff and Painful Shoulder. Physical Medicine and Rehabilitation For the Clinician. W. B. Saunders Co.
2. Bunnell, S.: Surgery of the Hand. 3rd Edition. J. B. Lippincott, 1956.
3. Bateman, J. E.: The Shoulder and Its Environs. C. V. Mosby Co., 1955.
4. Simmonds, F. A.: Shoulder Pain: With particular reference to the "frozen shoulder." J. Bone Surg., 31-B: 426-432, Aug. 1949.
5. Mennell, J.: The Science and Art of Joint Manipulation, Vol. I., The Blakiston Co., 1949.
6. Watson-Jones, R.: Fractures and Joint Injuries. Vol. II. Williams and Wilkins Co., 1955.
7. Armstrong, J. R.: Excision of the acromion in treatment of the supraspinatus syndrome. J. Bone Surg., 31-B: 436-442, Aug. 1949.
8. Bierman, W.: Physical Medicine in General Practice. Paul B. Hoeber, Inc., 1952.
9. Bosworth, B. M.: Calcium deposits in the shoulder and subacromial bursitis. J. Am. M. Ass., 116:2477-2482, 1941.
10. Brown, J. Tulloch: Early assessment of supraspinatus tears. J. Bone Surg., 31-B: 423-425, Aug. 1949.
11. Ellis, V. H.: The diagnosis of shoulder lesions due to injuries of the rotator cuff. J. Bone Surg., 35-B: 72-74, Feb. 1953.
12. Harrison, Stewart H.: The painful shoulder. J. Bone Surg., 31-B: 418-422, Aug. 1949.
13. Hitchcock, H. H. and Bechtol, C. O.: Painful shoulder: Observations on the role of the tendon of the long head of the biceps brachii in its causation. J. Bone Surg., 30-A: 263-273, April, 1948.
14. Jones, G. Blundell: Painful Shoulder: Calcification of the supraspinatus tendon. J. Bone Surg., 31-B: 433-435, Aug. 1949.
15. Keyes, E. L.: Anatomical observations on senile changes in the shoulder. J. Bone Surg., 17: 953-960, Oct. 1935.
16. McLaughlin, H. L. and Asherman, E. G.: Lesions of the musculotendinous cuff of the shoulder: IV. Some observations based upon the results of surgical repair. J. Bone Surg., 33-A:76-86, Jan. 1951.
17. Neviaser, J. L.: Adhesive capsulities of the shoulder: A study of the pathological findings in perioarthritis of the shoulder. J. Bone Surg., 27:211-222, April, 1945.

Rapid Rehabilitation of the Injured Back in an Industrial Environment

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Back injury and concomitant back pain account for more loss of time and production than any other traumatic event in industry today. The man-days lost have been variously estimated as 7.5 to 8.0 million[1] and the accompanying financial cost as $300,000,000. More back cases result in litigation than any other type of industrial injury. As Russek[2] writes, "The compensable back injury is a special problem and differs from all other industrial injuries in cost and time lost." In addition to the vexing problem of accurate diagnosis, much has been written about the varying methods of treatment. Treatment is arbitrarily divided into conservative and surgical. A large part of the conservative management as well as a part of postsurgical management has been properly designated as amenable to physico-therapeutic measures. Even among physical therapists there is marked variation in the methods of treatment and the modalities employed. Our purpose is to present one avenue of approach, the rationale of therapy, the regimen and the results of therapy, and the probable savings resulting therefrom. The National Safety Council's release of October 1955[3] gave as a year's experience in the State of Pennsylvania, with approximately 6,900 back injuries reported, financial awards amounting to $1,500,000, in compensation payments. If the award to the individual is considered as a direct cost, and the indirect cost to the economy is considered to be four times that figure, then these 6,900 injuries cost the good people of Pennsylvania about $6,000,000. In addition to this, the incalculable effects of pain and suffering of the injured person, the social and economic stress of the family, and possible adverse effects at the community level must be taken into account.

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Diagnosis and determination of the cause of back pain is difficult. According to Knapp,[4] causes or conditions producing back pain range from congenital anomalies to psychosomatic causes. Intermediate causes include: postural defects, neoplasms, arthritis, metabolic diseases, nerve lesions, circulatory diseases, and trauma. It is not our purpose to discuss the differential diagnosis of these conditions but rather to review the results achieved by conservative treatment.

Our form of therapy, with its indications and the rationale behind its success, was begun about three years ago in a small steel mill employing about 5,400, of whom 3,000 were engaged in rather arduous work. This report will center around experience in 1959, obtained in the treatment of 118 patients who complained of subjective pain in the back. The incidence of "backs" reporting to our medical facility was four per cent in a total population of 5,157 employees (Table 1.)

TABLE 1. Incidence of Back Disability in a Steel Plant—1959

Total new cases in dispensary	5,037
Total treatments in dispensary	20,115
Total new cases in P.T. (slightly in excess of 10%)	551
Total treatments in P.T. (44.9% of total treatments in dispensary)	9,096
Back cases in ratio to all cases	4.0%
Back cases in ratio to all cases in P.T.	38.9%

For purposes of this study, patients with certain diagnoses were not included. These were: (1) proven ruptured or protruded intervertebral disc; (2) sacroiliac strain or subluxation. Patients having sacroiliac strain or subluxation were treated but not included in this report because of a high index of suspicion that this disease does not exist; and (3) sciatic neuritis, which by diagnosis is an inflammatory process and should be treated by other accepted methods.

Regardless of cause, and in spite of diagnosis, the vast majority of our patients presented symptoms with certain common denominators which rendered them amenable to a relatively standardized form of therapy. These were:

1. *Spasm*—variable in its degree but almost always present when judiciously sought. May be sufficient to render erect posture impossible, or may be restricted to one muscle group or even one muscle.
2. *Pain*—may be sharp and pin-point in its location; or dull and described as aching, and widespread in its distribution. Often "trigger points" are elicited upon a careful search.
3. *Limitation of motion*—may be quite marked, or barely discernible at the extreme ranges of flexion and extension.

In an attempt to define the rationale of our treatment, the triad of spasm, pain, and limitation of motion must be discussed. Spasm is a protective device which the body initiates for the express purpose of limiting movement about a joint. The effect is that of an internal or auto-splint. This, however, results in impairment of the normal vascular and lymphatic exchange in the area of the spasm. Thus, with reduced oxidative exchange, and the accumulation of certain intermediate products within the cellular structure of the muscle fibers,[5, 6] pain results. Pain then prevents muscle activity which is needed to restore normal cellular metabolism, and thus the pain, spasm, and limited motion triad continues until interrupted.

It is our belief that any method which results in increased voluntary motion will result in improvement in the patient's feeling of well-being and his subsequent recovery. The classic methods employed are usually some modality to produce tissue heat—with resultant improvement in circulation and lymph flow—and, finally, forms of passive, then active motion to achieve total recovery.

Accepted methods for inducing heat in the patient are infrared radiation, hot packs, short wave and ultra-short wave diathermy, ultrasound, massage, and active and passive motion.

In our clinic the usual method for inducing heat is short wave diathermy. With the patient lying in the prone position, a pillow under his abdomen flattening the lumbar curve, the electrode is applied to the area in which the symptoms are most pronounced. With heating of the tissues, vascular and lymph stasis is somewhat reversed, and cellular metabolism is improved. Some believe that massage is the technic of choice after the part has been heated. It is our belief that effective massage, i.e., getting to the structures involved, might lead to a return of pain and subsequent muscular spasm.[7] In massaging a well-developed person, tremendous force must be exerted to produce an effect. Painful stimulation to the intervening structures may result. In our clinic, electrical muscle stimulation has largely replaced manual massage. The electrical impulses stimulate mild muscular contraction, appreciated by the patient and often visible to the therapist. The stimulated muscles contract in their entirety[8, 9] and this initiates the return of cellular metabolism to a normal state. Tissue oxidation is improved, cellular exchange is mobilized, and the waste products of cellular metabolism are removed. This return to physiologic normalcy results in decreased spasm and pain, and is usually expressed as pain relief on the part of the patient.[7]

The use of such equipment is simple enough; however, for the sake of completeness I would like to describe our application. The moistened pads are placed on any "trigger points," and a tetanizing current is applied in an ever-increasing intensity until firm muscular contraction is elicited. The current is maintained at this level until muscular fibrillation is obtained, and then a surging current of the same intensity is applied to the now fatiguing muscle. This contraction and relaxation cycle, resulting in passive muscular exercise not only improves circulation,[5, 6] relieves pain, and decreases spasm, but often results in some movement of the vertebrae, one upon the other, and even results in some movement of the pelvis upon the spinal column. Following a series of 5–10 such surges, the tetanizing current is again applied, held until fibrillation returns, at which time the current is reduced and the electrodes removed. Following the diathermy and electrical stimulation, the patient usually experiences good temporary pain relief, but only minor to moderate improvement of range of motion. If the initial onset of pain has been particularly severe, the above regimen may be repeated during the initial 24 hours without danger to the patient;[9] and frequently marked improvement will result. With unilateral involvement, the electrodes are approximated over the origin and insertion of the muscles or muscle groups involved.

The third step in our therapeutic regimen is exercise. Voluntary exercise cannot be initiated until the acute stage has subsided. We appreciate that muscles in spasm cannot work effec-

tively, and hence produce little, if any, motion about a joint. The exercises are designed for the purpose of strengthening the abdominal muscles and stretching of the hamstring, gluteal, iliopsoas, and back muscles. In any attempt to obtain the patient's cooperation, exercises are kept simple, and the exercise period is brief. A patient will do a short series 2–3 times per day rather than a long complicated group of exercises once daily. Once the acute stage of spasm and pain has begun to resolve and voluntary motion is once again possible, a planned series of exercises is outlined to the patient. All exercises are demonstrated and repeated each day, under supervision, to assure that the patient is carrying them out properly. In addition, the patient is instructed to perform his exercises daily at home.

All exercises are performed in the supine position. The first exercise is that of alternate, straight leg raising, the purpose of which is stretching of the hamstrings. This exercise is continued until the limit of straight leg raising is reached, then the knee is flexed and brought to the chest with the arms tightened about the leg. This terminal part of the exercise stretches the gluteal and the low back muscles.

The second exercise is similar to the first, but both legs are raised simultaneously through 45 degrees. Descent is slow and purposeful and, when properly performed, helps in strengthening the abdominal muscles.

The third exercise begins with the hips and knees flexed so that the feet rest flat on the horizontal surface upon which the patient reclines. With the arms extended in front, the patient rolls into a sitting position slowly and deliberately. This exercise is repeated to the point of fatigue at which time the exercise routine is terminated.

In our experience the preceding regimen has reduced lost work-time from 3.17 days (per back case treated in 1955) to 1.11 in 1959 (Table 2). At the current wage rate, this alone results in an annual saving to workers of at least $4,720 per year in differential between normal wages and disability income. In addition to preventing wage loss by the employees involved in injury, this shortened period of disability has resulted in an estimated 192 per cent decrease in direct compensation cost to the company (Table 3).

TABLE 2. Summary

	1955	*1959*
Total cases treated	62	118
Total treatments	800	727
Average treatments per case	13.1	6.07
Range	3–54 days	1–35 days
Average days lost	3.17	1.11

TABLE 3. Expected and Actual Performance Based on Experience Projection of 1955

Expected man-days lost (1955 experience)	374.06
Expected compensation cost (1955 experience)	$3,466.54
Actual man-days lost (1959)	130.9
Actual compensation cost (1959)	$1,178.10
Percentage savings (1959 vs. 1955 expected experience)	192%*

* Average employment 1955 3,954
* Average employment 1959 5,400 (3½ month strike)

Also, the added number of days worked, when viewed in the light of productive effort, results in another substantial sum accruing to corporate income. An estimate of days lost under the new therapeutic regimen shows that 243.16 man-days per year were added to the corporate productive effort of men skilled in their particular jobs.

REFERENCES

1. Accident Facts. Chicago, National Safety Council, 1958.
2. Russek, A. S.: Medical and economic factors relating to the compensable back injury. Arch. Phys. M. 36:316 (May) 1955.
3. Accident Facts. Chicago, National Safety Council, 1956.
4. Knapp, M. E.: Low back pain: conservative management. A.M.A. Arch. Indust. Health, 19:577, 1959.
5. Kovacs, R.: Electrotherapy and Light Therapy (6th ed.). Philadelphia, Lea & Febiger.
6. American Medical Association: A.M.A. Handbook of Physical Medicine and Rehabilitation. Philadelphia, Blakiston, 1950.
7. Long, C. L.: The Brief Story of Low Voltage Currents and Muscle Activation. Los Angeles, Birtcher Corp., 1954.
8. Best, C. H., and Taylor, N. B.: Physiological Basis of Medical Practice (3rd ed.). Baltimore, Williams and Company, 1943.
9. Wakim, K.: Physical Medicine and Rehabilitation. Philadelphia, W. B. Saunders Company, 1941.

Physical Therapy for Low Back Pain

Nicholas D. Lorusso, M.A.*

In the treatment of low back pain, the importance of a painstaking medical history and examination cannot be stressed too strongly. Of primary importance is an accurate diagnosis. The differential diagnosis of low back pain is not always easy, but it is extremely important because physical therapy is of no benefit to the patient whose low back pain may be caused by disease of the kidney or pancreas, carcinoma of the rectum or sacrum, prostatitis, and many other diseases.

The low back area consists of the lower part of the lumbar spine, the lumbosacral region, and the sacroiliac joints. During the Annual Conference in 1959, Martin[1] defined strain as "a stretching, tearing or rupture of a muscle, tendon or fascia, generally produced by a quick unbalanced contraction." The consensus of orthopedic surgeons is that true back strain rarely occurs. McBride[2] pointed out that of 2,000 cases of low back pain reported by the Orthopedic Staff at the Mayo Clinic, only 8 per cent were due to chronic postural strain, whereas in 445 cases, or approximately 25 per cent, protrusion of an intervertebral disk was suspected. Thompson[3] stated that although it is possible to tear ligaments in the low back region, to do so means that the disk too has likely been injured.

If a patient comes in with true low back strain, probably caused by a twisting action while lifting, neurologic signs should be absent. Also, with adequate treatment, the normal course of recovery should follow that of a strain of any other normal joint, with this important difference: the time required for recovery will be longer because of the difficulty of applying adequate fixation.

Acute low back strain cannot be treated adequately on an out-patient basis. The effort required and the pain produced by coming to a physical therapy department, and returning home again, would not justify the minimal relief, if any, a person might obtain during the short period of treatment. Therefore, patients with low back strain should be hospitalized for treatment.

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In the early stages the important problem is to relieve the pain. This is best accomplished by strict bed rest on a firm mattress. The Williams' position of flexion of knees, hips, and trunk gives relief of pain to a number of patients. Traction may be applied to the pelvis or legs immediately, or after a few days if pain has not decreased significantly. Many physicians believe that the only advantage of traction, and it is an important one, is to keep the patient at rest in bed. It is probably best to allow the patient bathroom privileges, as this is often less traumatic than using the bedpan.

At this time, no exercises that cause discomfort to the back should be advised. To preserve muscle tone, exercises for the arms and legs might be prescribed only if they do not produce pain. During this period of rest any comfortable position is permitted, including the side-lying curled position. The patient usually wishes to change his position frequently. Heat in the form of infrared or Hydrocollator packs may be applied several times a day. The physician frequently prescribes medication to help relieve severe pain. Massage may or may not be indicated at this time.

Krauss[4] suggested use of surface anesthesia in the form of ethyl chloride for acute, painful muscle spasm. Many therapists have obtained relief of pain by local application of cold. Some physicians advise their patients, while the condition is still acute, to begin an exercise program. The patient may be instructed to do one exercise, such as bringing the knees into the armpits 10 to 25 times every hour.

When the acute condition begins to subside, graduated exercises and activities are prescribed. The acute phase may pass to the chronic phase, if not properly followed with exercise and instructions for activity.

Support in the form of a corset or brace may be prescribed. The Williams' brace permits full flexion of the lumbosacral spine, but prevents extension. Some physicians prefer a corset to a brace because the latter is too uncomfortable. A back support is, in a sense, a crutch and should be used only for selected patients. In addition to preventing unwanted motions, the back support

acts as a reminder to the patient for proper body alignment. The patient must be instructed not to "fight" the support, but to work with it. It is important that proper exercises be performed during the period a patient is wearing a back support. These exercises are necessary to prevent muscle weakening while the patient is bound up with a support.

Many "low back" patients are able to walk into a physical therapy department for treatment. These are the people who may have had one episode of acute low back strain, which may or may not have been treated by hospitalization. Later, they have recurrent attacks of low back pain or constant dull aching. These are the "chronic cases." They have to be taught to "live with their disability." Treatment should be as simple and as practical as possible. For this reason it might be best not to use diathermy, electrotherapy, ultrasound, or massage because of the tendency of these patients to acquire a fixed idea that a certain modality is absolutely necessary for their full recovery. Actually, the exercise program will be the most helpful.

Helping patients to "learn to live with their disability" does not end with teaching them a few exercises and ascertaining that they do them correctly. Patients must also be instructed as to which postures should be avoided or—to use the positive approach—how to perform everyday activities in the proper manner. Most patients cannot be taught the exercises in one session, nor can they be taught to do them by handing them a sheet of paper with instructions, even if these contain diagrams. At least two sessions are necessary. It is desirable for the patient to come in for three consecutive days the first week, then perhaps once a week for the next few weeks. Patients who must drive long distances for treatment should be requested to stay in town, rather than make such long drives.

Exercises that have given good results are those designed to decrease the lordotic curve. The anterior abdominal and the gluteus maximus muscles, when contracting, will decrease the lordotic curve, whereas contraction of the erector spinae and the hip flexor muscles will increase the lordosis.

Williams[5] and Regen and Hillman[6] established regimens of exercises that they have found helpful in the conservative treatment of low back conditions.

Exercise One in Williams' exercise progam, is a "sit-up" from the supine position with the hips and knees flexed. This exercise is designed to strengthen the anterior abdominal muscles. Hips and knees are flexed to exclude action of the psoas muscles as much as possible.

Exercise Two is the "pelvic tilt" done in the supine position with the hips and knees flexed. Williams used this exercise for active development of the gluteus maximus muscles. It is interesting to note that in describing this back flattening exercise, he stated that the pelvis is rotated forward. Most physical therapists would describe this as rotation backward.

Exercise Three is done with the knees brought into the axillae. This exercise is designed to stretch the erector spinae, and tightened fasciae and ligaments in the lumbar area. The grip on the knees should not be released as the knees are brought forward and away from the axillae.

Exercise Four is an attempt at toe-touching from a sitting position. This exercise—which is used to stretch the low back area and, in some instances, the short hamstring muscles—Williams believes, is not always indicated.

Exercise Five is intended to stretch the anterior structures of the hip. The patient first assumes the squat position. Then one knee is flexed until it contacts the anterior axillary fold. The weight of the upper trunk is supported by extended arms and the lumbosacral spine is in a position of flexion; then the opposite lower extremity is extended at the hip and knee, and the weight is taken on the ball of the foot. By flexing the forward knee, the hips move up and down and cause a stretch in anterior hip structures of the extended extremity. This exercise is not always indicated.

Exercise Six is a full squat from the standing position. It is used to stretch the low back area and to strengthen the gluteal muscles. In this exercise it is important to keep the feet flat on the floor to prevent extension at the lumbosacral area.

Regen and Hillman[6] used just four exercises. Three of them have already been described. Their first exercise is the one in which the knees are brought up to the axillae. The second exercise is the sit-up exercise, as previously explained. In the third, a new flexion exercise appears. While in a sitting position with the hips abducted, the patient curls forward, and with the elbows flexed, pushes the arms toward the floor. The fourth exercise is the full squat exercise. It may be of interest to know that Regen and Hillman strive to have their patients with acute back conditions do all these exercises every hour. If a patient complains of severe soreness, he is instructed to do at least the first exercise every hour.

Besides performing exercises, patients should be instructed in carrying out common activities without increasing the lordosis and causing pain. These include:

1. Rolling to one side and pushing with the arms when getting out of bed.
2. Not wearing high-heeled shoes.
3. Bending the knees while leaning over to put on a necktie or to brush the teeth.
4. Sitting with the knees higher than the hips.
5. Carrying heavy objects over the shoulder whenever possible, rather than in front of the waist.
6. Not lifting heavy objects above the waist.
7. Not working with the hands above the head.

SUMMARY

Bed rest is important in the acute phase of low back strain. Use of uncomplicated postural exercises and instructions in proper posture for performing everyday activities are important in treatment of chronic back strain. If physical therapy is to be helpful in the treatment of low back pain, a diagnosis amenable to physical therapy must be established. If a patient does not respond to treatment as well as the physical therapist thinks he should, the fact must be made known to the patient's physician. No attempt has been made to describe "a best treatment" because treatment must vary with the individual patient. Low back strain is not an easy problem with which to cope, but with a rational approach and patience, much may be accomplished.

REFERENCES

1. Martin, G. M.: Sprains, strains, and whiplash injuries. Phys. Ther. Rev. 39:808-813, 1959.
2. McBride, E.: Disability of the back. Orthopedics, 2:98-99, 119, 1960.
3. Thompson, F. R.: Differential diagnosis of herniated disc causing low back pain in adults. Orthopedics, 2:93-94, 113-117, 1960.
4. Kraus, H.: Diagnosis and treatment of low back pain. GP, 4:55-60, 1952.
5. Williams, P. C.: The conservative management of lesions of the lumbosacral spine. Am. Acad. Orthop. Surgeons, Lect., 10:90-121, 1953.
6. Regen, E. M. and Hillman, J. W.: Flexion Exercises for Low Back Mechanical Disorders. Motion Picture of Central Office Film Library, Veterans Administration, Washington, 1956.

Rehabilitation Problems Associated with Fractures and Dislocations

Katherine D. Leary*

In and outside our facility those participating in total rehabilitation include the patient's local physician; the orthopedic consultant in the area, should his advice be necessary; the claims department of the insurance company; the rehabilitation nurses; and nurse counselor, acting as liaison between the employee who has been injured, the employer, the insurance company, and the Rehabilitation Center staff. Within the center, the staff includes the medical director, four orthopedic surgeons, two internists, a psychiatrist, a nurse counselor, physical therapists, occupational therapists, prosthetists, a vocational counselor, and, of course, the administrative staff.

To demonstrate the multiple problems involved in the total rehabilitation of the severely injured worker in industry, and the operation of the Center, several cases are presented.

CASE REPORTS

CASE ONE

J. A., a 45-year-old paper cutter, was injured in October, 1957, when he fell approximately 25 feet

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down an elevator shaft. He was alone in the building at the time and was faced with the fact that he would have to remain over the weekend in the elevator shaft. He managed to pull himself out of the pit; and two hours later he arrived at the hospital in a state of shock. Blood transfusions were administered.

Diagnosis: Compound fractures of the right lower leg, a fracture of the left upper tibia and fibula without any serious displacement of the fragments, and a fracture of the left os calcis.

Surgical Procedures

Twelve days later an open reduction of the right tibia was done with internal fixation by means of a long plate and screws. The leg was then immobilized in a long plaster cast. On the left side, the fracture of the os calcis was reduced; and this fracture, as well as the proximal fracture of the tibia and fibula were also immobilized in a long plaster cast. Sastisfactory alignment of the right tibia was obtained. Reduction of the left os calcis was not completely satisfactory, for the fracture was severely comminuted, particularly in the subtalar region. The fractures of the left upper tibia and fibula were maintained in good position in the plaster cast. Later, it was found that the patient also had sustained a compression fracture of the third lumbar vertebra without serious kyphos.

The left leg remained in the long-leg plaster cast for five months—after which a long-leg, double upright, caliper brace with a drop-lock knee and free ankle was worn for one month. On the right side, the leg was maintained in a long-leg plaster for six months, and then in a walking long-leg plaster for another two and one-half months. The cast was removed on July 24, 1958. The patient was admitted to the Rehabilitation Center on July 28, 1958.

Orthopedic Examination

Left leg. Notable atrophy, thickening about the knee joint, 15 degrees of permanent flexion, and flexed further to about 125 degrees. Thickening of foot and ankle with pitting edema. Ankle motion from neutral to 30 degrees of plantar flexion, 5 degree inversion and eversion. Midtarsal joints somewhat limited. All toes markedly limited. Virtually no dorsiflexion.

Right leg. Notable atrophy of thigh and calf, some edema of ankle and foot. Right knee moved from 25 degrees of permanent flexion to about 65 degrees. Ankle motions were limited.

Back. Examined in a sitting position. Excellent motions with no complaints of discomfort.

Physical therapy prescription: Whirlpool to the feet, ankles and knees, to be followed by graduated active resistive exercises. Emphasis on knee extension and progressive resistance exercises (PRE) for quadriceps. Left side: gentle exercises of a similar nature.

Physical Progress Report—January 1959:

"Progress is steady. Today, he started using a cane. The patient lifts PRE weights as follows:

Left knee—extension 15 pounds.
Right knee—extension 12½ pounds.
Left foot—dorsiflexion, inversion, eversion, and plantar flexion 15 pounds.
Right foot—dorsiflexion, inversion, eversion 8¾ pounds.
Plantar flexion—20 pounds.

The patient has no complaints relative to his back. He is still doing trunk exercises. His complaint when he tires is of pain in the left ankle. Patient works hard, is cooperative. He needs close supervision, however, as he has a mind of his own."

The patient spent extensive time practicing typing. He borrowed a typewriter from the Center so that he could practice at home over the weekend. Difficulty arose in that it became increasingly apparent that his previous job would no longer be available to him.

COMMENT

Treatment was carried out with some variations governed chiefly by the patient's tolerance. By the summer of 1959, he had full extension and flexion to within 10 degrees of the range possible on the right side, good stability, and marked improvement in muscle strength. Ankle and foot motions had improved, permitting him to walk well with the aid of a cane, and enabling him to use public transportation. He also took Civil Service examinations, which was his own idea.

After a long search, aided by the vocational counselor and also (of noteworthy significance) by his own efforts, this man obtained a job in the accounting department of a local transportation company. He is still working and likes his job. The starting salary was $64.00 a week (previous average weekly earnings prior to injury were $70.00), with an advance to $68.00 at completion of three months of service. The estimated economic potential for his job will be $500.00 a month, depending on application and motivation. Thus, a great deal of time and money were spent on a very severely injured man. However, the rewards, particularly in human dignity, were incalculable.

CASE TWO

C. R., a 43-year-old truck driver, was standing on the tail-gate of his truck on September 14, 1957, when he pitched forward and fell to the pavement, landing on his left elbow. He was taken to the emergency room of the local hospital where he was given emergency treatment. Because of the severity of the elbow injury, he was referred to an orthopedic surgeon on the hospital staff.

Diagnosis: Left elbow fractures with wide separation of the olecranon of left ulna and with fracture dislocation of the radial head.

Surgical Procedures

November 23, 1957. Fixation of the ulna and the olecranon with a screw, and excision of some fragments from head of the radius. Primary resection of head of the radius deferred.

December 12, 1957. Resection of left radial head and neck. Extensive adhesions and arthritic changes noted in joint. After surgery, patient received physical therapy in the hospital.

July 27, 1958. Resection of distal left ulna. Physical therapy resumed.

Orthopedic Examination

The patient was admitted to the Rehabilitation Center on December 11, 1958, chiefly for strengthening exercises of entire left arm. On admission he had extension to about 160 degrees, and flexion to just beyond a right angle. Supination and pronation were limited to about 45 degrees. The wrist was stable and the muscles were of fairly good strength. Atrophy of three-quarters of an inch in circumference was present in the left forearm, three inches below the bend of the elbow.

Physical therapy prescription: Whirlpool, to be followed by graded exercises to develop the strength of the biceps and triceps, as well as exercises to increase range of supination and pronation, and strengthening exercises for wrist. In occupational therapy, establish a work level.

COMMENT

The patient was discharged on March 3, 1959. Strength had increased and all motions had improved. Percentage loss of function of left arm was 15 to 18 degrees. A wristlet was fitted for protection. Eventually, this man returned to his regular job as a truck driver. As he did prior to his injury, he loads his truck. The average weight of articles to be loaded weigh from 30 to 40 pounds.

CASE THREE

B. K., a 55-year-old male, was injured on September 8, 1959, while testing antennas for an electronics firm. He fell from a tower, a distance of about 22 feet.

Diagnosis: Bilteral os calcis fractures. The radiologist's report stated, "Severe fractures involving heel bones of both feet. The one on the right shows very slight depression of the subtalar facet with fracture lines running into the subtalar joint, and slight elevation of the posterior fragment of the calcaneus. The fracture on the left is more severe; and the articular surface with the talus is driven down into the substance of the body of the os calcis, with multiple fracture lines extending into the subtalar joint and completely through the body of the os calcis. The posterior fragment was riding high, with reversal of the normal astragalocalcanean angle."

Surgical Procedures

Right side. (September 11, 1959.) A Steinman pin was inserted through the tubercle; the proximal fragment was forced down into position; and the middle facet was angulated into its position under the subtalar joint. Wire was threaded into the anterior fragment of the os calcis. The wire was then cut off and a plaster cast was applied.

Left side. Open reduction with grafting from the ilium was done and a plaster cast was applied. The patient was in the long-leg casts for six weeks, and in the short casts for four weeks. On December 10, 1959, the casts were removed. He used crutches for about two weeks and discarded them (his own idea.)

COMMENT

He returned to work on January 12, 1960—an unusually rapid return to work. He was given a job testing equipment while sitting at a bench. The job also entailed being on his feet, walking, and moving about for as long as one and one-half hours. He was admitted to the Rehabilitation Center on January 18, 1960, through arrangements made by the area Rehabilitation nurse and the plant physician. He reported for physical therapy three times a week. Treatment consisted of whirlpool, bilateral exercises for feet and ankles, and use of the stationary resistance bicycle. Treatment was given quite late in the afternoon, after a full day's work.

The patient was discharged two months later with no complaints of pain, and with an excellent gait considering the severity of the injuries. This man was an unusually cooperative and hard-working "solid citizen." A valuable employee was returned to an appreciative employer in an unusually brief period of time.

SUMMARY

These cases are typical of those seen in our Center. The fractures and dislocations are frequently severe and require varying periods of rehabilitation. Some patients return to jobs held prior to the accident, others to adjusted jobs. For some, a return to the employment held previous to injury is impossible, inasmuch as the patient cannot possibly meet the physical demands of the job. In physical therapy we must always remember that our patients must regain as much function and muscle strength as is possible. While this is being accomplished, we must show our patients that we understood the many problems of the severely injured. This attitude is of inestimable help to everyone concerned, thus enlarging our role of physical therapist to that of a "friend in need."

Case Reports

Treatment of Plantar Warts with Ultrasound

Thomas Novasic, B.S.*

The treatment of plantar warts with ultrasound is a relatively new and little understood process. Results in such cases, however, have been very good. The following is a case report of such a treatment.

History

In January 1955, Mr. K., a 23-year-old white male, noted the appearance of a single wart on the plantar aspect of his left foot. He was treated for this wart at various times during the next year with many forms of therapy, including high potency vitamin A, dry ice, acids, and electro-desiccation. Nevertheless, the wart remained, and by the summer of 1956, multiple warts, approximately the size of a dime, had developed in the area. These warts (now called mosaic) were removed by electro-desiccation, which left an ulceration in the patient's foot about three-eighths of an inch deep. This healed in approximately a month, but the warts grew back through the scar tissue and enlarged to the size of a nickel.

Electro-desiccation was tried again in the spring of 1957, with results comparable to the earlier desiccation. At this time, new warts began to appear next to the others. The warts continued to spread during 1958, despite continuing various treatments, including acids and salves.

In the spring of 1959, electro-desiccation was again used. This time the ulceration produced was very painful, and the patient was forced to ambulate with a cane for a month. By this time the warts had become so extensive that both surgical removal and x-ray treatments were considered impractical. Liquid nitrogen was then used and seemed to give the best results to date. The treatment, however, was a painful one.

It was at that time the patient was referred to our physiatrist for consultation and, following the technic described by Dr. H. Kent, ultrasound treatments were prescribed.[1]

Treatment and Technic

The ultrasonic equipment used in this case was a Burdick Ultrasonic Model number UT-1. The coupling medium was mineral oil, which was reapplied at various intervals during the treatment to maintain good contact with the skin. The dosage used was .6 watts per square centimeter (watts/cm^2) for fifteen minutes. This output was chosen in accordance with Kent's experiments. A firm pressure of the sound head was maintained throughout the treatment and a circular motion employed. A total of ten treatments, to be given at one-week intervals, was prescribed.

Results

After the initial treatment, there appeared to be a darkening of the central cores of many of the warts. At that time, this change was minimal.

After the second treatment, Mr. K. stated that his foot felt like a "normal foot" again for the first time in years. Further darkening of the warts continued and they appeared to be diminishing in size. The skin now appeared dry and scaly. The patient trimmed this dead skin with a razor at home.

After the third treatment, marked improvement was noted. The majority of the warts had diminished considerably in size or had disappeared completely, being replaced by new skin. The warts on the little toe, which had not been treated by any other means previously, had disappeared completely with no evidence of scar tissue.

After five treatments, only a few warts, located at the base of the first metatarsal, remained. The patient stated that these warts had been most extensively treated with previous forms of therapy. Although the majority of the warts had been resolved by this time, ultrasonic therapy was continued for the remainder of the ten prescribed treatments with emphasis placed on the few remaining warts.

At the conclusion of the tenth treatment, the results noted over the entire treatment period were very dramatic. The multiple plantar warts had disappeared, being replaced for the most part with new skin. Scar tissue remained at the site of some of the warts, which was considered to be a residual of previous forms of treatment (electro-desiccation). A summary of the repair process is as follows:

1. Darkening of the central core of the wart.
2. Further darkening and diminution in size of the wart (the warts appeared to shrivel up).
3. Skin became dry and scaly.
4. Gradual necrosis of the wart.
5. Appearance of new skin in place of the wart.

Comparison with other Cases

In similar cases as cited by Kent, single, discrete,

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Treatment described in this paper was performed at St. Joseph's Hospital, Milwaukee.

Plantar warts treated with electro-desiccation and various salves and acids.

Same foot after ten treatments with ultrasound.

recent plantar warts were preferred. In these case studies, ninety per cent were said to have had excellent results. In each case, the recovery process was similar to that of Mr. K. In our patient's case, however, multiple warts were involved, and those warts which had no previous treatment, such as those on the little toe, showed the fastest improvement.

Since sufficient time has not yet elapsed, the results stated here do not preclude the possibility of recurrence. However, in all previous cases reported by Kent, results remain unchanged after a year's time.

The factors that account for these changes are not clearly understood at this time. It is hoped that future research and investigation of ultrasound will provide the rationale for these tissue responses.

REFERENCES

1. Kent, H.: Plantar wart treatment with ultrasound. Arch. Phys. M. 40:15-18, 1959.

Suggestions from the Field

An Assistive Device for Quadriplegics

Muriel McGlamery*

Many quadriplegic patients with lesions at the fifth cervical vertebra and below regain functional use of their elbow flexors and shoulder muscles, but often have only very slight return of function of the triceps and of the hands. Hoists and lifts have been designed for assistance in getting into and out of an automobile, but these permit very little use of the patient's functional muscle power. Usually, such equipment requires permanent attachment to the roof of the automobile. Another disadvantage is the cost of these items.

An assistive device which can be made at very reasonable cost enables the quadriplegic or paraplegic to lift part of the weight of his trunk and lower extremities, and thus accomplish the task of transferring from a wheel chair into an automobile more easily (Fig. 1).

* Staff Physical Therapist, Veterans Administration Hospital, Oklahoma City, Okla.

FIG. 1. Quadriplegic demonstrating use of the device.

FIG. 2. Showing the detail and threading of the safety belt.

MATERIALS REQUIRED

1. One 7-inch length of ¾-inch angle iron.
2. One 9-inch length of ¼-inch rod iron.
3. One 3½-inch length of ¼-inch rod iron.
4. Two ⅜-inch nuts.
5. One 2½-inch length of 1½-inch angle iron.
6. One 30-inch length of 2-inch-wide safety belt webbing.
7. One friction buckle.

CONSTRUCTION

The 9-inch length of rod iron is bent into a U shape with a 5-inch base and 2-inch arms. Then one inch of each arm is bent at a right angle and welded onto the ¾-inch angle iron. The 3½-inch length of rod iron is welded onto the 1½-inch angle iron at the apex. This piece then fits into the two nuts which are welded onto the long rod, permitting a free swinging arrangement of the 1½-inch angle iron. The safety belt is threaded as shown in Figure 2.

With the narrow angle iron fitting into the drain trough of the auto, the majority of the patient's weight is transferred onto the frame of the car rather than on the drain trough.

A quadriplegic patient with elbow flexors, deltoids, and shoulder depressors of functional strength can use this device in combination with a sliding board, and can get into an automobile with minimal assistance from one other person. The device is also helpful to paraplegics who do not use long-leg braces.

By using two of these devices, one attached on either side of the car, a strap can be run all the way across inside the car; and additional leverage may be gained once the person is halfway inside the car. This arrangement has been successfully used by a quadriplegic who weighs 130 pounds. Another advantage is that it appreciably reduces the strain on the person assisting him.

Editorial

A Good Physical Therapist

A good physical therapist may sometimes be called on to give spiritual advice not only in a positive sense, but also to combat bad influences. Too many well-meaning but empty headed people who, when trying to comfort the sick, say, "Just have faith, and you will get well," which would mean, I suppose, that if they did not completely recover, they were spiritual slackers.

If we don't look upon God as a hard man, we have every reason to congratulate ourselves. We say we think Him merciful, kind, loving, but in our hearts we look upon Him as hard. Three-quarters of the troubles of good people come from this. He feels intensely our misconception of Him. We look upon Him as a hard, grasping man, who wants to get all He can out of us and give nothing in return. And woe betide us, if we fail to satisfy Him. This is utterly wrong. If God has ever shown us any love, He must love us still. The therapist and his patient must take things as they come. If God had sense enough to create this world, He has the wisdom to take care of it. Obedience to God's will is not the easiest thing in the world, but it is the only philosophy that really works.

FATHER REGINALD KELLY
St. Alice Church
Fort Worth, Texas

PRAYER

O Lord, who did spend Your earthly life doing good and healing the sick, help us to follow in Your footsteps in the art of healing. You, who are the author of all physical laws, help us to use the knowledge we have learned to relieve pain and restore health. Give us the grace to be patient and understanding with our patients. Help us to graciously accept medical direction from our superiors. Assist us in being diligent in our work, especially in the task of improving ourselves by acquiring new knowledge. Help us to realize that just as You have given man the ability to use physical forces for healing, may we always offer our work for Your greater honor and glory. Help us to keep our first fervor and ideals in desiring to heal the sick and to realize our high vocation. Inspire us to direct our lives helping others for Your sake. Amen.

—*Father Reginald Kelly*

EDITOR'S NOTE: Father Kelly was a victim of polio while attending school in San Antonio, Texas. Eventually, however, and with special dispensation from Rome, he was able to complete his studies and became the first priest to be ordained in Fort Worth, his home town. The prayer, sent by Irene Mae Lang of the Texas Chapter, was given by Father Kelly at a Chapter meeting, held in Fort Worth, April 8-10, 1960.

Letters

To the Editor:

The following rhyme possesses little merit poetically; however, it aptly expresses my sentiments regarding delivery of the *Physical Therapy Review*.

Forgive me if I seem to nag,
But each September there is a lag
In the mailing of the *Review*;
At least in my case this has been true.
The *Review* is very important to me.
It has many articles as fine as can be.
For this reason I would like to know:
Where is September's issue? and
Why is October delivery so slow?

News of activities or meetings occurring in September is of little value to us if it is not received until October, and this is true if these events occur in any other month. I realize that September is a difficult month for many industries and organizations, but the problem of posting reports and magazines has somehow been resolved; i.e., *The Atlantic Monthly* (September issue) was received by subscribers in August.

Any information regarding this problem would be greatly appreciated.

Sincerely yours,
Elliott T. Fleming
Physical Therapy Department,
Good Samaritan Hospital
Lexington, Kentucky

P.S. Forgive me. The September issue has just been received.

To Our Readers:

We like Mr. Fleming's jingle and are pleased that he didn't jangle. His appended postscript does not alter the need for reply. The Editorial Staff of the *Review*, too, has been deeply concerned about the tardiness of the *Review* in recent months. We offer this explanation to Mr. Fleming and all readers.

The tardiness of the September issue, which with its 96 pages is the largest September issue ever published, was not the result of inept management. This issue contained several innovations. For the first time the National Office Statistical Reports were combined with National Office narrative reports. Previously, the Statistical Reports appeared in the August issue; narrative reports appeared in September. The Executive Director and Consultant Staff agreed that hopefully these reports would be more meaningful to our members if the information was compiled in one report, which was done. Also, because the number of "Positions Available" has increased steadily for several years and the amount of material has become unwieldy, we decided to classify the ads by regions as a service to the reader as well as to the advertiser. Any innovation requires additional time for production. The course of least resistance is to follow the same old format, but such a philosophy contributes to dullness. However, neither these changes nor the size of the issue were insurmountable; the tardiness of the September issue was cumulative.

The February issue, dedicated to Mary McMillan, Founding President of the Association, required a great deal of time for planning and production. This memorial issue received many favorable responses. We are proud of it and know that no member of the APTA, young or old, could ever forgive publication of an inappropriate issue or failure to at least try to reflect our gratitude to Mary McMillan. The February issue, too, was 96 pages.

The April issue included material important to the profession—the first report of a research survey identifying members' participation in research, and an abstract of a thesis on state board examinations. These articles along with others and 1960 Conference publicity added up to a 104-page issue, the largest in the history of the *Review!* The April issue was mailed on April 29, at least three weeks behind schedule.

Production of the *Review* normally entails a "three-ring circus." The staff does not work on just one issue at a time. For example, in late April, by the time page proofs are received for the May issue, the galley proof on original articles for June should be sent to the authors for their approval and correction; and the original articles for the July issue should be prepared for the printer. As it turned out, the original articles for the July issue, with the exception of one, were set in type late in June, rather than late in April. Similar problems occurred with all material and we have been "off schedule" ever since.

The Report of the Physical Therapy Review published in the September issue, pages 692-693, portrays growth of the *Review* over a ten-year period. The 1958 and 1959 volumes contained 860 pages each. Average issues were 72 pages. The 1960 volume grew to 924 pages; the average number of pages per issue was 77. The 1960 volume with 64 more pages than the 1959 volume contained a "hidden" issue; hence the tardiness. We hope that by early 1961 we will have resumed our former schedule and that readers will receive their issues within the first week of the month.

In our defense, we must ask Mr. Fleming that he not compare the *Review* with the *Atlantic Monthly*. The character of the content is not the same. Ours is a professional journal, published since 1921 with a minimum number of paid employees and an Editorial Board serving on a volunteer basis. We cannot, nor do we wish to compete with the *Atlantic Monthly*. Our goal is to publish a *professional* journal of quality.

DOROTHY E. VOSS
Editor-in-Chief

Association News

Mrs. Mary Shannon Snook, a Charter and Life Member of the Association, died in Trinidad, Colorado, on August 30, 1960. Following graduation from the University of Arkansas, she taught English and Physical Education. When Reconstruction Aides were needed during World War I she responded and graduated in the first class at Reed College in Oregon. She was assigned to army and governmental hospitals across the country for several years. After her marriage, her travels continued and she established some of the first physical therapy services in Colorado, Minnesota, Oregon, Pennsylvania, and Washington. Again, during the early part of World War II, she served at army installations in Texas. She also found time for graduate study and clinical courses to keep abreast of new approaches to treatment procedures.

Mrs. Snook had a flair for writing which was recognized by several awards, but most of her material was published under a *nom de plume*. She had a great interest in children which is evident in her long association with services for crippled children.

Although Mrs. Snook has not been able to be active in Association affairs in recent years, she will be remembered for her participation with other charter members at the 1951 Annual Conference in Glenwood Springs, Colorado.

Marriages

Nancy Blackett, of Needham, Mass., now Mrs. Nancy B. Nagel, Newton, Mass.
Dorothy DeMaria, of Pittsburgh, Pa., to Marvin Eisenberg, Great Neck, N. Y.
Mary A. Elliott, of Baltimore, Md., to Gary L. Hughes, Sykesville, Md.
Jean W. Evans, of Riverside, Calif., now Mrs. Jean E. Szabo, Fontana, Calif.
Jeanne M. Fay, of Columbus, Ohio, now Mrs. Jeanne F. Kulick, Columbus.
Gail Garland, of Saugus, Mass., to Kenneth H. Molloy, Northboro, Mass.
Susan C. Grafe, of Fort Campbell, Ky., to William P. Rust, Fort Campbell.
Anne A. Hake, of Long Beach, Calif., to Robert Kernott, Corona Del Mar, Calif.
Carol L. Hamilton, of West Haverstraw, N. Y., to Stanley J. Evans, Boston, Mass.
Mary Hillen, of Augusta, Ga., to Neil A. Johnson, Augusta.
Texas J. Hughes, of Albuquerque, N. M., now Mrs. Texas H. Boling, Albuquerque.
Margaret Hunter, of Tenafly, N. J., now Mrs. Margaret H. Bennett, East Norwalk, Conn.
Joyce K. Ishizaka, of Berkeley, Calif., now Mrs. Joyce I. Miyake, Berkeley.
Barbara J. Lambie, of Inkster, Mich., to Warren North, Herbert, Mich.
Patricia R. Leary, of Chicago, Ill., now Mrs. Patricia L. de La Van, Oak Park, Ill.
Margaret L. Maloney, of Berkeley, Calif., to William F. Borba, Placerville, Calif.
Janet L. Noll, of Oakland, Calif., now Mrs. Janet N. Gayner, Berkeley, Calif.
Patricia A. O'Meara, of St. Louis, Mo., to James J. Raymond, Jr., St. Louis.
Laura Perkins, of Trucksvlle, Pa., now Mrs. Laura P. Fidler, Cincinnati, Ohio.
Barbara L. Peterson, of Detroit, Mich., to George LaChapelle, Grosse Pointe, Mich.
Doris A. Raab, of Boston, Mass., to Virgil C. Arff, Boston.
Ann Silk, of New York, N. Y., to Jordi Gaton, Jamaica, N. Y.
Edith L. Snow, of Oklahoma City, Okla., to A. M. Lane, Birmingham, Mich.
Janet E. Tevekelian, of Auburndale, Mass., to Haig Jeghelian, Westwood, Mass.
Nina Varjian, of Franklin, Mass., to Stephen C. Stressenger, Canton, Mass.
Coralie O. Witherspoon, of Hickory, N. C., to James D. Grist, Jr., York, S. C.

APTA Chapters Complimented by National Health Council

"Grass Roots Participation in the Health Careers Program" has been reported by the National Health Council. Based on a "cross-section" inquiry by the Council, the report reflects responses from about 200 state and local Health Career groups with more than 2400 national agency affiliates (including APTA Chapters and Districts). The cross-section involved nearly one-third of the organized Health Career programs throughout the country.

Philip E. Ryan, Executive Director (NHC), commented to Lucy Blair, Executive Director (APTA), as follows:

> "Though we already knew that the physical therapists are playing an important part in state and local Health Career committees, I am impressed by the showing of your affiliates in the enclosed cross-section survey. Even in this relatively small sample, the record of cooperation speaks for itself. I am glad to call to your attention the evidence

provided by this survey and to have this opportunity once more of expressing our appreciation."

Of 107 national agencies or organizations, Chapters and Districts of the APTA were reported as affiliated with state and local health councils in 34 states, with a total of 75 affiliations. These 75 affiliations represent 69 per cent of the total number of APTA Chapters and Districts, which numbered 108 as of April 30, 1960.

The record of APTA Chapters and Districts, in this important Health Council effort to interest students in physical therapy as a profession, was surpassed by only 7 of 107 organizations: Women's Auxiliary to the American Medical Association—102; National Tuberculosis—89; American Medical Association—88; Committee on Careers in Nursing—88; American Nurses' Association—86; National League for Nursing—81; and American Heart Association—80.

At least 25 professional organizations have participated at the grass roots level. Physical therapists, through their professional organization, the APTA, will want to relate to local (city) and state health councils in all states in order that our recruitment efforts may be enhanced.

Chapter News

Southern California

The regular meeting night for November was changed to coincide with the AHA Institute for Physical Therapists at Los Angeles. The Chapter was host to the institute participants.

Florida-West Coast District

The District has conducted a card survey of its members. Each member has been requested to reply to questions on professional training and experience as well as activities in the Association. The September "West Coast News" also listed the members and their addresses.

Georgia

The members were requested to reply to an October 1960 newsletter questionnaire. Preference for future chapter meetings and projects as well as membership interest were to be given by the respondent. The newsletter also reprinted items from the APTA Chapter Bulletin–August 1960.

Iowa

A 1960 Directory has been printed and distributed by the Chapter. Physician recipients of the Directory were provided with a model physical therapy referral blank. The third annual rehabilitation seminar for physical therapists, October 14 and 15, 1960, included discussions on: Legislation for Paramedical Groups; Bell's Palsy; Symptoms and Problems of the Intervertebral Discs; Derangement of the Knee; the "C.V.A." Patient; Bone Tumors; New Developments in Electrodiagnostic Equipment; Ultrasound in the Treatment of Decubitus Ulcers; Administrative Problems Relating to Physical Therapy; and Scoliosis.

Illinois

Members of the Chapter who were preparing for the Illinois Physical Therapy Examination, and those preparing for the APTA examination for foreign-trained physical therapists, had an opportunity to attend three review sessions and take a refresher examination. The sessions were held September 19, 20, and 22 in the Physical Therapy Department at Northwestern University Medical School.

Kentucky

Members in the Lexington and Louisville areas are receiving telephone reminders of coming meetings. Post cards are sent to those in the outlying areas not conveniently reached by phone.

Massachusetts

A call to share knowledge appeared in the September newsletter through the following item: "Information requested regarding the whereabouts of: new twists to 'old' therapy procedures, new adaptive equipment developed, new technics of treatment, little 'tricks' that have helped bring about better treatment. Look carefully. What is 'old hat' to you is probably just what someone else is looking for. Know the joy that comes from giving—give to the success of your Chapter and your Association."

Massachusetts—Western District

North Adams was the location for the District's October institute "The Cervical Spine, Cord, and Nerves." The topic was developed through discussions on the normal cervical region, traumatic injury and disease of the cervical area, and the brachial plexus.

Michigan—Eastern District

The membership committee is urging District members to join in car pools for transportation to meetings and is developing lists of members for this purpose.

Michigan—Western District

The signs of Fall—a falling leaf, a football helmet, and a squirrel eating a nut—appear on the front page of the September newsletter which announces the first meeting of the season at a local 4-H Camp.

New York

Welcome to the new districts of Genesee Valley and Niagara Frontier which replace the dissolved Western District. (The APTA now has 57 component chapters and 51 districts.)

New York—Greater New York District

At the annual meeting of the District, two members were honored for their many loyal and devoted years of service. Miss Dorothy Schumer, past District Chairman, received an engraved gavel, while Miss Elizabeth Addoms, who had previously received an engraved gavel, was presented with a service plaque.

North Carolina

"The Role of the Therapists in a Handicapped Swimming Program" was presented at the October meeting in Charlotte. Members also had the opportunity, later in the month, to attend a symposium on "Cystic Fibrosis," held at the University of North Carolina School of Medicine.

The education committee is planning for the Chapters' observance of Physical Therapy Week, which in North Carolina has been set for February 13–18, 1961.

Oregon

Fee schedules and related problems were discussed by two representatives of the State Industrial Accident Commission at the October Chapter meeting in Eugene.

Oregon—Northern District

A program for the year has been published and sent to the members. The theme, "Learning and Doing of a Physical Therapist," includes topics such as: Technics of Setting Up a Research Project, Legal Liabilities of a Physical Therapist, and Therapy in a Special School for Handicapped.

Texas

The legislative committee has a program underway to assist the Texas Medical Association in determining the ethical and qualified physical therapists in the state. The information gained by the Chapter survey will be available to the medical society members.

Vermont

The film, "Still Going Places," and a report by the Chapter representative to the Governor's Conference on Aging, constituted the program for the September Chapter meeting at White River Junction.

Virginia

The Chapter sponsored a two-day seminar at the Medical College of Virginia, October 22–23. "The Utilization of Neurophysiological Phenomena in the Treatment of Patients with Hemiplegia" was conducted by Miss Signe Brunnstrom, Instructor, College of Physicians and Surgeons, Columbia University.

Wisconsin

"I'm dressed in white from head to toe,
The question is, "What am I"—do you know?
Am I a waitress, a nurse or an aide?
Am I a cook, or am I a maid?
Do I sweep floors, do I clean teeth?
Do I sell popcorn, do I wash sheets?
No, No, No, I'm none of these.
Guess again, if you please.
I'll give you one hint and then you will know—
In spite of my free time, I've no time to sew!
Give up you say, well here's the catch—
You see, I'm a P.T., without my "patch."

—*Wisconsin Newsletter.*

Original Papers for Conference

Members of the Association who have been working on special projects related to physical therapy procedures—research, clinical or laboratory; reviewing results achieved with a group of patients; adaptation or application of new methods of treatment; or any other subject which will advance the profession—should plan now to report their work in Chicago next July.

Two copies of manuscript, typed (double spaced), should be submitted to Dorothy E. Voss, Editor in Chief, *Physical Therapy Review*, by Apr. 1, 1961. The *Review* Editorial Board will select papers to be read by members and has the prerogative of publishing those papers selected. Members will be notified of the Board's decision not later than April 25.

New Student Members

Boston University

Carl A. Nuthak

Childrens Hospital

Jane M. Capps
Vicki K. Crosby
Richard E. DeVine
C. Gerald Griffeth
Jane P. Huber
Helen J. Katz
Jane D. Lightfoot
Suzanne C. McHaley
Mary K. Mennet
Warner B. Owens
Patricia A. Peterson
Helene T. Yabuta

Bouve-Boston School

Meredith A. Adams
Elizabeth M. Baldwin
Susan Bon
Joanne Buckley
Lindsey D. Butler
Susan A. Duntley
Katherine Ford
Linda L. Friedman
Cynthia Greeley
Diane L. Kline
Louise N. Krauss
Beverly R. McClure
Glenda S. McLeod
Harriet F. Palmer
Virginia D. Patroni
Barbara L. Pesin
Natalee Proudman
Diane L. Shearer
Felice Singer
Emma D. Stein
Kathleen A. Stevens
Ellen D. Thompson
Nancy D. Trombacco

College of Medical Evangelists

Alma L. Swena

Columbia University

Suzanne D. Blum
Sylvia M. Braband
Audrey B. Cantey
Retta Davis
Susette DuPuy
Patricia Z. Eadie
Lee J. Fryling
William H. Gibbs, Jr.
Gerit Giesecke
Karen S. Johnstone
Diane M. LaIacoma
Georgianna Lawrence
Rinah R. Lipis
Arthur P. Littlestone
Claire P. Martin
Cynthia S. Maxcy
Jane J. Miller
Sandra B. Munvez
Frances D. Parker
Carol L. Radetsky
Cynthia A. Scott
Carol A. Tessier
Willa R. Voeltz
Rita Wolraich

Frank E. Bunts Institute

Betty I. Brenneman
James A. Vermilya

Grady Vaughn School

Billy W. Bankhead
Frances L. Bussert
Robert E. Constante
Celia C. Giles
Judith Hargrave
John F. Hughes
Glenda S. Hulings
Clayton E. Millard
James K. Purvis
Betty J. Riddle
Joe B. Wood

Hermann Hospital

Joan Armstrong
Michael A. Breiner
Donnie D. Davis
Auguste J. dela Houssaye
Mary L. Garza
Paul E. Giesenhagen
Frank J. Hamik
Estelle F. Harf
Arnold W. Harkins
Charlynn C. Harris
Bert S. Haydel
Barbara L. Henry
Jimmy C. Hollander
Gaylen D. Holmes
Nancy L. Jarratt
Nancy L. Johnson
Jack E. Lester
Juana T. Lloyd
Carla E. Loggins
Barbara M. Lowe
Joe L. McLean, Jr.
William E. O'Daniel, Jr.
David L. Parks
Barney I. Seely
Carol A. Sherwin
John Wells
Marilyn J. Wells

Marquette University

Mary Ann Morrison

University of Buffalo

Barbara L. Bader
Margery A. Barden
Marcia M. Buzzelli
Caroline A. Carpenter
Sally G. Connor
Carol A. Ligo
Gina S. Markus
Joseph J. Meyer
Hynda E. Rosenberg
Christina D. Ruszaj
Richard M. Thompson
Tana E. Tuttle
Barbara J. Watson
Irving R. Weber

New York University

Bruce M. Bedell
Lea Danciger
Ronald J. Fitterer
Susan Scott

Stanford University

Susan Holt
Barbara A. Lambert
Gordon A. O'Neil

United States Army, MFSS

Bonnie Blossom
Joanne Bury
Carole Buss
Mary H. Huston
Dolores A. Leonard
Barbara A. Machen
Joicey M. Putnam
Sonya E. Riddick
Carolyn A. Smith
Barbara J. Van Akin
Mary P. Van Tine

University of California

Sally J. Alpers
Deanna L. Ball
Sharon B. Ballonoff
Gwenie L. Bell
William P. Brewer
Carroll Conklin
Carole A. Connelly
Carol L. Edwards
Eileen D. Fajans
Jeanie L. Fong
Olga T. Gaytan
Robert H. Gifford
Frances G. Jallu
Mary G. LaBuda
Gunilla D. Malmstrom
Bror W. Mattson
Valerie J. Ng
Sharon N. Nicholas
Harry M. Ong
Margaret K. Osaka
L. Patricia Padams
Sandra L. Putnam
Gale H. Short
Philo S. Short
Audrey B. Syme
Sharon Thomas
Catherine A. Turner
Sylvia C. Volpi
Joan G. Wiseman

University of Colorado

Barbara J. Brady
Lou E. Bargert
Joanna J. Eisenbud
Robert H. Hale
Joyce M. Jessen
Joy J. Kinney
Lorna D. Mackinnon
Euayne L. Martin
Laurie L. McMurray
Elizabeth A. Milbank
Ottis E. Rhodes

Indiana University

Johanna M. Gaiser
Marilyn S. Gober
Wallis G. Meredith
Nancy S. Otto
Lenora L. Wallace
Thelma D. Witten

University of Iowa

Dmitri Andrews
Carl T. Anderson
Marcia L. Barnes
Perry G. Bleadorn
Walter W. Blount
Fred W. Brown
Robert J. Brown
William T. Campion
Malcolm J. Carter
Maureen P. Coates
Judith K. Davis
Jim B. Elliott
Clayton A. Eloe
Walter S. Englebrecht
Gerald G. Erickson
Richard D. Halland
Mary C. Houlihan
Maurna E. Kaufmann
Mary L. Miller
Donna M. Pingree
Roberta M. Rabenhorst
Laurie S. Redick
Gary W. Reke
Gary L. Soderberg
Bernard Suffel
Calvin C. Verhoef
Duane R. Vorseth
Larry D. Watkins
Thomas A. Wheatley

Ithaca College

Frederick C. Chubb
Evelyn Lerch
Ann M. Marshall
Robert J. Roberts
Arthur A. Zoeckler

University of Kansas

Dennis L. Conger
Judith V. Culver
Pamela G. Daves
Lola H. Harman
Linda I. Harvey
Barbara A. Holm
Marilyn B. Klee
Roberta J. Knollhoff
Mary H. McFerson
Judith A. Morgan
Barbara A. Reynolds
Virginia D. Sabin
Geraldine A. Schnatz
Shirley B. Scott
Peggy L. Shanks
Betty B. Snider
Alahna C. Weller
Lucy J. Weisbender

University of Maryland

Herschel Budlow
Ernest M. Sisk

University of Michigan

Charlyn DeYoung
Susan L. Howatt
Carol Janowsky
Judith L. Krempa
Carol Larson
Eileen Lentner
Carolyn Michael
Barbara Niehaus
Mary Simington
Katharina Smutko
Heddie Solomon
Mary L. Thacker

University of Minnesota

Jane M. Bennett
Patricia A. Christianson
Sonja M. Messner
Karen J. Nearing

Northwestern University

Janet L. Bauch
Nancy M. Brown
Frances H. Colehour
Norma A. Gant
Nancy L. Giuntoli
Ruth D. Goshert
Daniel B. Hard
Patricia H. Hissong
Patricia D. McMaster
William W. Murray
Nancy A. Olney
Dorothy M. Robinson
Patricia E. Rooney
Jo Ann Rutherford
Judith A. Tredway
Lynda L. Whyte
Miyako Yahata

University of North Carolina

Madeline F. Danielson
Nancy J. Wason

Ohio State University

Barbara R. Bostic
Nancy J. Brunsman
Chester R. Corbitt
Ray W. Delamotte
Harry H. Dunning
Harvey E. Frazier, Jr.
Evelyn M. Gottschalk
Carol G. Harman
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June L. Hayden
Cynthia M. Henderson
Carol L. Humerickhouse
Daniel W. Maloney
Kay P. Myers
Gunhild D. Nyberg
Tyrone D. Rupp
Nancy A. Saunders
Erika A. Schick
Gerald W. Shumway
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Robert G. Steffl
Anne L. Stiles
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University of Oklahoma

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Donald S. Henderson
John Pellow
Linda C. Schneider
Marilyn E. VanMeter

University of Pennsylvania

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Constance B. Angotti
S. Daneen Baker
Beatrice G. Brown
Anne L. Bullen
John C. Campbell
Helen P. Crease
Elaine M. Eckel
Richard Frantz
James M. Friery
Estelle J. Herr
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Eldridge M. Ward
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Russell Sage College-Albany Medical College

Patricia A. Harris
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Education

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The National Foundation Health Scholarships in nursing, occupational therapy, physical therapy, medical social work, and medicine offer financial aid to deserving students interested in careers in these understaffed health professions. One of the purposes of this investment by The National Foundation is to help relieve the shortages of personnel in the health fields and thus assure more adequate care for patients.

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Detailed information may be obtained from The National Foundation Health Scholarships, 800 Second Avenue, New York.

APTA-OVR Institute

The seventh annual APTA-OVR Institute will be held at the Extension Study Center of the University of Oklahoma, April 16–21, 1961. Funds for this program are available through a grant from the Office of Vocational Rehabilitation and matching funds from the American Physical Therapy Association. The 1961 Institute Committee met on October 10–11, in Chicago; the committee members were Doris Porter, Educational Administrator of the Grady Vaughn School of Physical Therapy in Dallas, Texas; Wallace Strittmatter, Instructor in the Department of Physical Therapy, St. Louis University, Missouri; and Nancy Ward, Chief of Physical Therapy at Wadsworth VA Hospital, West Los Angeles, California.

Tentative goals for the Institute, to be titled, "Clinical Educational for Physical Therapy," will include the following objectives: to define the needs of physical therapy students in a program of clinical experience; to propose educational goals of the program of clinical experience for physical therapy students; and to develop criteria for participation by clinical centers in the education of physical therapists.

The 90 participants will represent the physical therapy directors and clinical instructors from the approved programs in physical therapy.

SHORT TERM COURSES FOR GRADUATE PHYSICAL THERAPISTS

Title of Course	*Sponsor of Course*	*For Details Contact*	*Dates of Course*
Cerebral Palsy	The North Carolina Cerebral Palsy Hospital Durham, North Carolina	Dr. Lenox D. Baker Medical Director No. Carolina C. P. Hosp. Durham, North Carolina	Courses arranged according to individual need—duration 3 months
Physical Therapy in the Care of Neuromuscular Disease	Georgia Warm Springs Foundation Warm Springs, Georgia	Robert L. Bennett, M.D. Medical Director Ga. Warm Springs Found. Warm Springs, Georgia	January April October
Technics of Neuromuscular Reeducation	California Rehabilitation Center Vallejo, California	Margaret Knott, Chief P.T. Calif. Rehab. Center Vallejo, Calif.	January 1 April 1 July 1 October 1

Title of Course	Sponsor of Course	For Details Contact	Dates of Course
Below-Knee Prosthetics	U. of California and U.S. Office of Vocational Rehabilitation	Dr. Miles H. Anderson, Director, Prosthetics Education Program—University of California Los Angeles 24, Calif.	Jan. 23—27, 1961
	Post-Graduate Medical School & College of Engineering, New York University; & U.S. Office of Vocational Rehabilitation	Prosthetics Education New York University Post-Graduate Medical School 550 First Avenue New York 16, New York	January 26—27, 1961
Advanced Physical Rehabilitation Methods for Physical/Occupational Therapists	New York University Medical Center—Institute of Physical Medicine and Rehabilitation (in cooperation with New York University School of Education)	Mrs. Edith Buchwald Lawton, Director, Postgraduate Education for Paramedical Personnel, New York University Medical Center, Institute of Physical Medicine and Rehabilitation, 400 East 34 Street New York 16, N. Y.	Jan. 30—Feb. 24, 1961 Apr. 24—May 19, 1961
Cerebral Palsy Technics of Treatment	Children's Rehabilitation Institute for Cerebral Palsy Reisterstown, Maryland	Christopher H. Wiemer Executive Director Children's Rehab. Inst. Reisterstown, Maryland	Jan. 2—Mar. 17, 1961 April 3—June 16, 1961 July 3—Sept. 15, 1961 Oct. 2—Dec. 15, 1961
Lower-Extremity Prosthetics	Post-Graduate Medical School & College of Engineering, New York University; & U.S. Office of Vocational Rehabilitation	Prosthetics Education New York University Post-Graduate Medical School 550 First Avenue New York 16, New York	March 13—24, 1961 April 10—21, 1961
Upper-Extremity Prosthetics	Post-Graduate Medical School & College of Engineering, New York University; & U.S. Office of Vocational Rehabilitation	Prosthetics Education New York University Post-Graduate Medical School 550 First Avenue New York 16, New York	May 15—26, 1961
Neurophysiological Bases For Rehabilitation	School of Allied Medical Professions U. of Pennsylvania and U.S. Office of Vocational Rehabilitation	Miss Roslyn Schlansky Coordinator of Special Courses School of Allied Medical Professions University of Pennsylvania 3901 Pine Street Philadelphia 4, Pennsylvania	January 16—27, 1961
Growth and Development	School of Allied Medical Professions U. of Pennsylvania and U.S. Office of Vocational Rehabilitation	Miss Roslyn Schlansky Coordinator of Special Courses School of Allied Medical Professions University of Pennsylvania 3901 Pine Street Philadelphia 4, Pennsylvania	February 13—17, 1961
Graduate Physical Therapy Program	Rancho Los Amigos Hospital Downey, California	Chief Physical Therapist Rancho Los Amigos Hospital 7601 E. Imperial Highway Downey, California	2nd Monday in March to 1st Monday in Sept. 2nd Monday in Sept. to 1st Monday in March

Schools Offering Courses in Physical Therapy

APPROVED BY THE COUNCIL ON MEDICAL EDUCATION AND HOSPITALS OF THE AMERICAN MEDICAL ASSOCIATION*

Schools offering the four-year program leading to a baccalaureate degree accept high school graduates and transfer students. Schools offering the 12 to 16 months' program leading to a certificate accept students who have completed all or most of their undergraduate work, provided they meet certain course requirements. Students should arrange their college work so that on graduation they will hold baccalaureate degrees regardless of the plan of study, and should investigate course requirements early. For specific information regarding each school's requirements, curriculum, tuition, and other fees, write to the *physical therapy director*, indicated below.

	Degree	*Certificate*
CALIFORNIA		
Mary J. Dodge School of Physical Therapy Childrens Hospital Society 4614 Sunset Boulevard Los Angeles 27	‡	†
Ronald A. Hershey School of Physical Therapy College of Medical Evangelists Loma Linda	†	†
Lucille Daniels Division of Physical Therapy School of Medicine Stanford University Stanford (Palo Alto)	†	†
Margery L. Wagner Curriculum in Physical Therapy University of California The Medical Center San Francisco 22	†	†
Margaret S. Rood Department of Physical Therapy University of Southern California Los Angeles 7	†	†
COLORADO		
Dorothy Hoag Curriculum in Physical Therapy University of Colorado Medical School Denver 20	†	†
CONNECTICUT		
Frances M. Tappan School of Physical Therapy U 101 University of Connecticut Storrs	†	
ILLINOIS		
Elizabeth C. Wood Course in Physical Therapy Northwestern University Medical School 303 East Chicago Avenue Chicago 11	†	†
INDIANA		
Frances C. Ekstam Physical Therapy Program School of Medicine Indiana University Medical Center Indianapolis 7	†	
IOWA		
Olive C. Farr Physical Therapy State University of Iowa Hospitals Iowa City		†
KANSAS		
Ruth G. Monteith Section of Physical Therapy Education University of Kansas Medical Center Kansas City 12	†	†
MARYLAND		
Gladys E. Wadsworth, Ph.D. Department of Physical Therapy School of Medicine University of Maryland Baltimore 1	†	
MASSACHUSETTS		
Adelaide L. McGarrett Physical Therapy Department Boston University Sargent College University Road Boston 15	†	†
Constance K. Greene Department of Physical Therapy *Bouvé-Boston School, Tufts University Medford 55	†	
Shirley M. Cogland *Program in Physical Therapy Simmons College The Fenway Boston 15	†	†
MICHIGAN		
Virginia Wilson Curriculum in Physical Therapy The University of Michigan University Hospital Ann Arbor	†	†
MINNESOTA		
Dale V. Shaffer School of Physical Therapy Mayo Clinic Rochester	‡	†
Wilbur L. Moen Course in Physical Therapy University of Minnesota 860 Mayo Memorial Building Minneapolis 14	†	

* Accepts women students only.

‡ Baccalaureate degree available from an affiliating college or university.

* In collaboration with the American Physical Therapy Association.

	Degree	Certificate
MISSOURI		
Sr. M. Imelda, S.S.M. Department of Physical Therapy St. Louis University 1325 South Grand Boulevard St. Louis 4	†	
Beatrice F. Schulz Department of Physical Therapy Washington University School of Medicine 660 So. Kingshighway St. Louis 10	†	
NEW YORK		
Dorothy L. McLaughlin Russell Sage College-Albany Medical College Division of Physical Therapy Albany 8	†	†
Mary E. Callahan Courses for Physical Therapists Columbia University College of Physicians & Surgeons 630 West 168th Street New York 32	†	†
A. Garman Dingwall Division of Physical Therapy Ithaca College-Albert Einstein College of Medicine Ithaca	†	
Elizabeth C. Addoms Physical Therapy Curriculum School of Education, New York University Washington Square East New York 3	†	†
Mildred F. Heap Program in Physical Therapy University of Buffalo 3435 Main Street Buffalo 14	†	†
NORTH CAROLINA		
Helen Kaiser Division of Physical Therapy Box 3403, Duke University Medical Center Durham		†
Margaret L. Moore Section of Physical Therapy School of Medicine University of North Carolina Chapel Hill	†	
OHIO		
Robert D. Kruse, D.P.E. Course in Physical Therapy Frank E. Bunts Educational Institute 2020 East 93rd Street Cleveland 6	‡	†
Gladys G. Woods Curriculum of Physical Therapy Ohio State University University Hospital Columbus	†	†
OKLAHOMA		
Thelma Pedersen School of Physical Therapy University of Oklahoma, Medical Center Oklahoma City 4	†	†
PENNSYLVANIA		
Dorothy E. Baethke Division of Physical Therapy University of Pennsylvania 3901 Pine Street Philadelphia 4	†	†
Kathryn Kelley Division of Physical Therapy D. T. Watson School of Physiatrics Leetsdale	‡	†
PUERTO RICO		
(All classes given in Spanish) Lutgarda V. Piñeiro School of Physical & Occupational Therapy Candelaria & Mandry Streets Stop 22, Santurce	†	†
TEXAS		
Doris E. Porter Grady Vaughn School of Physical Therapy Baylor University Medical Center Dallas 10	†	†
Cecelia J. Lee School of Physical Therapy Hermann Hospital Houston 25	‡	†
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Susanne Hirt School of Physical Therapy Medical College of Virginia Richmond 19	†	
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U. S. ARMY MEDICAL SERVICE		
*Physical Therapy Course Army Medical Service School Brooke Army Medical Center Fort Sam Houston, Texas Write to: The Surgeon General Department of the Army Washington 25, D. C. Att.: Personnel Division		

* Accepts women students only.

‡ Baccalaureate degree available from an affiliating college or university.

Please direct all inquiries regarding tuition, entrance requirements and other specific information to the school and *not* to the American Physical Therapy Association.

Abstracts

Urinary Incontinence

Leonard V. Smiley (Dept. of Urology, Fordham Hospital, New York), AM. PRACTITIONER, 11:485-496, June 1960

Urinary incontinence is almost a daily problem for the family physician. One needs only to name the stress incontinence of middle-aged women and that associated with prostatic disease in elderly men to be reminded of this common physiologic disturbance. Treatment must be based upon an understanding of the mechanism of micturation and be directed toward the return of normal function of the urinary tract. Present-day treatment may include surgery, drugs, or physical therapy.

The physical therapy treatment has its chief value in conditions which have weakened, but not destroyed, sphincteric and pubococcygeus muscular function. Voluntary contractions of these muscles strengthens them and speeds recovery. Physical therapy is the only method of approach in the treatment of senile urinary incontinence. The aims of treatment are to increase the time interval between automatic reactions, to have the patient recognize the presence of a full bladder and to voluntarily empty it before the reaction is incited.

Fusimotor Nerve Function in man

W. M. Landau, R. A. Weaver, and T. F. Hornbein (Division of Neurology, Beaumont-May Institute of Neurology, St. Louis, Missouri), A.M.A. ARCH. NEUR., 3:32/10-45/23, July 1960

This paper illustrates fusimotor (gamma efferent) blockade by differential nerve block applied at the intrathecal and epidural levels, in relation to the theories that tonic fusimotor hyper activity may be the basis for pathologically increased reflexes and muscle tone by sensitization at the stretch receptor and spinal levels, and that decreased fusimotor activity may underlie the symptoms of cerebellar lesions.

Progressive anesthetic blocks at the midlumbar level were studied for their effects on tendon reflexes, sensation, strength, and muscle tone, especially of the quadriceps femoris muscle. The study included ten normal subjects, eleven with chronic clasp-knife spasticity of the quadriceps femoris muscle, and eleven Parkinson patients with rigidity in the quadriceps femoris. Electromyographic recordings were made of activity during strength testing, rapid passive flexion and extension of the knee in spastic and rigid subjects.

Results on normal subjects indicated that stretch reflexes can be selectively blocked by local anesthetic effect upon small fusimotor efferents, whereas large diameter stretch afferents and motor efferents remain relatively unaffected. No suggestive simulation of cerebellar disease was observed during depression of fusimotor activity.

In spastic subjects, tendon reflexes and strength were depressed together. Spasticity and clonus, when present, were depressed early during the progressive blocking procedures. The authors believe this deviation may be due to inadequate differentiation of fiber groups by the anesthetic agents, or that central fatigue impaired motor loss more than did motor axon blocking.

In parkinsonism, tendon jerks were highly susceptible to blocking; and strength was more often affected earlier than in other subjects. It is doubtful whether this poor separation of strength and reflex represents significant pathophysiological variation. Rigidity and resting tremor decreased with the diminution of the tendon reflex, though both could persist to some degree to the point of strength diminution. It appears clear that, although rigidity is largely maintained by proprioceptive reflexes, a basic part of the resistance to passive movement is due to persistant motoneuronal discharge.

Direct electrical stimulation of a motor nerve with its proprioceptive afferents may give a response (the H-reflex) independent of stretch receptor responsivity in the muscle. Comparison then of the H-reflex during progressive fusimotor blockade should give a direct measure of the sensitivity of the stretch receptor population in the muscle. Experiments on nine subjects, three from each category, showed similar results. As the tendon jerk was depressed, the H-reflex diminished to a somewhat lesser degree, and strength was relatively unaffected. This H-reflex depression suggests that the motoneuron firing level is also depressed because fusimotor blockade leads to lowering of the tonic potentiating afferent activity arising from stretch receptors. Tendon reflex depression with gamma efferent block is due to a rise in threshold at two levels: the stretch receptor end-organ and the motoneuron synapse.

Sensory examinations in thirty experiments revealed the following order of decreasing sensitivity to block: pinprick, heat and cold, vibration, light touch, and position sense. The latter two were accompanied by severe loss of strength.

If tendon reflex excitability is a fair measure of muscle spindle activity, this study indicates that strength in normal man is remarkably independent of local proprioceptive conditioning.

Functional improvement in spasticity and rigidity by fusimotor blockade is not clearly indicated, though other investigators are studying this possibility. This study gives no evidence that spasticity or rigidity is caused by excessive fusimotor discharge or that fusimotor hypofunction is an adequate explanation for cerebellar ataxia in man.

Present-Day Concept of Rehabilitation in Tuberculosis

A. Gerson Hollander and Carrie E. Chapman (Veterans Administration Hospital, Oakland, California), AM. REV. RESPIR. DIS. 82:91-95, July 1960

During a period of three years, 155 consecutively admitted patients were studied. All were placed on a formalized program of physical rehabilitation—with the goal of returning the patient to his former job immediately upon discharge from the hospital. Criteria for admission to the program were stable lesions on x-ray examination, absence of cavitation, and consistently negative sputum.

Once placed on the program, patients become fully ambulatory, are required to make their own beds, keep the bedside area clean, eat meals in the main dining room; and are permitted unrestricted activities. Once daily, they attend a program of muscle reconditioning conducted by a physical therapist. At the start this includes walking from one-eighth to one-quarter of a mile. This is gradually increased until, by the second month, the patient is on a full program including: walking—one mile; arm flexion and abduction—20 times each with ten-pound weights; trunk flexion and twisting —ten minutes; stair climbing—one

flight, round trip; bicycle—50 repetitions; and deep knee bends—10 times. In addition, the occupational therapist plans a suitable work-tolerance program, starting with one hour and increasing to three hours daily.

Follow-up reports were obtained for 118 patients. Eighty-eight were fully employed in a variety of jobs. Twenty-two were not working (most of these were in the older group and past retirement age or had an additional disability). There were four deaths, none related to tuberculosis; and three relapses in severe alcoholics. Since the group represented a wide variety and severity of disease, ranging from minimal to far advanced, and miliary, the low incidence of relapse is felt to be significant evidence of the program's value.

A Method for Increasing the Depth Heating Effect of Infrared Radiation

R. Harris and S. K. Sarkar, ANN. PHYS. MED. LOND., 5:252-257, August 1960

The therapeutic action of "radiant-heat sources" is based on the absorption of electromagnetic radiation and its transformation into heat in the body tissues. The majority of radiation is absorbed in the skin; and most experiments on intact human beings have shown only negligible rises in temperature in the muscles or deep tissues. The radiation pain threshold is a limiting factor. A technic allowing an increase in energy incident on the skin surface might be expected to produce increased depth effects so far as temperature rise was concerned.

A study was made on patients in the rehabilitation unit, using the conventional method of infrared heating, and using a Calcutta technic of applying radiant heat combined with a fan or blower which moves air at room temperature over the part, and apparently prevents sweat formation.

Results of the two technics are compared in temperature changes produced in skin, muscle, and subcutaneous tissue.

The results showed that with the Calcutta modification, a greater increase in temperature rise occurs subcutaneously than with the conventional method of infrared application.

Electromyogram in Neuromuscular Reeducation

A. A. Marinacci and Marcel Horandi (Department of Neurology-Neurosurgery, University of Southern California Medical School, Los Angeles, California), BULL. LOS ANGELES NEUR. SOC., 25:57-71, June 1960

Voluntary motor function depends upon the transmission of nervous impulses from the cortical centers, through the upper and lower motor neurone chain, to the muscle fibers. In a variety of conditions this pathway may be temporarily blocked by disease or injury; and subsequently fail to be restored to voluntary control even after anatomic continuity has been reestablished. The patient has "forgotten" how to transmit impulses—the "motor engrams have become disorganized." The basic problem of neuromuscular reeducation is to retrain the patient to utilize these latent pathways. Electromyography is a valuable tool in this program.

The patient is first taught to recognize the sound and appearance of normal muscle discharge by inserting the electrode in such a muscle, and practicing varying grades of contraction. The needle is then moved to the affected muscle, and a voluntary contraction is requested. Various abnormal responses may be seen, ranging from absence of nerve impulses to reflex discharge or a faltering voluntary discharge. Although visible motion may be absent at first, the patient is thus able to appreciate even minimal response to his voluntary efforts. Retraining of latent pathways is facilitated. This procedure is applicable in cases of either upper or lower motor neurone lesions. Case histories are given, describing technics and results in cases of hemiplegia, reversible physiological block, causalgia, peripheral nerve injuries, substitution patterns, Bell's Palsy, and residual paralysis following poliomyelitis.

In addition, two other areas of use are mentioned. Patients with excessive muscular tension in the neck region may be helped to appreciate, and so relax this tension. In cases of severe residual paralysis, when only minimal latent function can be detected by electromyography, this technic facilitates maximum control of the few remaining units during hypertrophy exercise. They may then be developed to maximum strength and form "giant motor units" which provide some increase in functional strength.

Using these technics, "a certain amount of functional return was obtained even in cases wherein other methods of treatment (physical therapy, electrical stimulation, and reconstructive surgery) had failed, even though tried for many years."

Decrease in Muscle Spasm Produced by Ultrasound, Hot Packs, and Infrared Radiation

F. P. Fountain, J. W. Gersten, and O. Sengir (University of Colorado School of Medicine, Denver, Colorado), ARCH. PHYS. MED., 41:293-297, July 1960

Two groups of patients were studied to determine the effect on muscle spasm produced by ultrasound, hot packs, and infrared radiation. The static force balance—a measure of the force required to initiate movement—was used to measure the resistance to passive lateral flexion of the neck, and to passive extension of the leg. Normal subjects were studied and control values were established.

In the normal subject, average force necessary to initiate lateral neck flexion was 2 ounce, without significant difference between left and right. In the patient with neck spasm, a 12 per cent increase was noted when force was applied to the painful side. In one group of patients, followed for a longer period of time, the necessary force decreased in relation to the reported decrease in pain.

Hot packs were applied for twenty minutes with changes every five minutes. Infrared radiation was applied by means of a 1,000-watt lamp, positioned sixteen inches from the skin. Ultrasound, using the moving head technic with mineral oil coupling, was applied for five minutes at an intensity of 0.95 or 1.5 watts per square centimeter.

All three technics produced a significant decrease in the amount of force required to initiate movement. The maximim decline was apparent only ten to fifteen minutes after treatment was terminated. The effects of hot packs and infrared on spasm were almost identical and were greater than that produced by ultrasound. However, poliomyelitis patients, with acute hamstring spasm, displayed significantly decreased force readings following hot packs, as compared with the other two technics.

The authors conclude that it is

difficult to substantiate the frequently heard statement that heat effects are similar, no matter what the source.

Apraxia of Gait: A Clinico-Physiological Study

John S. Meyer and David W. Barron (Department of Neurology, Wayne State University, College of Medicine, Detroit, Michigan), BRAIN, 83:261-284, June 1960

Apraxia of gait, due to cerebral lesion, is the loss of ability to properly use the lower limbs in the act of walking, which cannot be accounted for by demonstrable sensory impairment or motor weakness. Some diseases giving rise to apraxia of gait are tumor, atherosclerosis of the anterior cerebral artery, abscess, paretic neurosyphilis, pre-senile and senile dementia, and cerebral hemorrhage.

In a review of the literature pertaining to disturbance of gait, associated with lesions of the cerebrum, there was general disagreement as to how this symptom was produced. In large space containing lesions of the frontal lobes with brain displacement, the cerebellum and medulla may become compressed, giving rise to cerebellar signs; or the eighth cranial nerve may be stretched, causing vertigo and ataxia. In cerebral lesions, without displacement of the brain, apraxia of gait may result.

The authors feel that the apraxia of gait, following cerebral lesions without brain displacement, is a true apraxia and should not be confused with "ataxia." They studied a series of seven cases, six of which showed no increase in intracranial pressure; and in the seventh case there was no reason to suspect any displacement of brain. In all the patients studied, the motor mechanism for moving the legs remained intact; cerebellar signs were absent; and the cortical spinal tracts showed little or no damage. Disturbance in initiation of movement at the cortical level seemed responsible for the apraxia of gait. Primary difficulty appeared to be particularly in the abstract performance of motor movement such as: taking the first step; kicking an imaginary ball; touching an object with the toe; turning, and in some cases, sitting and standing. Once movements were started, performance improved. All the patients showed a "magnetic" attraction of the foot to the ground. "Tonic innervation," rigidity, and perseveration of movement were present in all the cases. These signs, in addition to others charted by the authors, serve to differentiate apraxia of gait from cerebellar ataxia. Apraxia of gait results from a transcortical innervatory paralysis of the legs.

Goniometric Study of the Human Foot in Standing and Walking

Peter V. Karpovich and Leighton B. Wilklow (Springfield College, Springfield, Ill.), INDUS. M. & S., 29:338-347, July 1960

This paper reports the results of an attempt to develop simple, reliable methods for obtaining information on foot action. One aspect investigated was pronation and supination during standing and walking. An electrogoniometer, a new instrument, was developed for this study. The angle formed by the lower leg and calcaneus was measured to determine the extent of pronation and supination.

The report consists of two parts. First, extent of pronation or supination was measured to determine: (1) the effect of functional insoles as compared with conventional insoles; (2) the effect of distance between the feet; (3) the effect of body weight distribution; (4) the effect of heel height; and (5) the validity of the manual goniometer used in this investigation for measuring the angle formed by the lower leg and calcaneus. In the second part of the study, the same angle was measured and recorded automatically during walking by the electrogoniometer.

The results of the study showed that with conventional insoles there was 5.4 degrees of supination, whereas the functional insolves produced 6.3 degrees. This difference was not statistically significant. In subjects standing on inclined planes adjusted to 5, 10, 15, and 20 degrees of pronation, the functional insole caused no statistically significant supinating effect. The need of an increase in supination was questioned.

For diagnostic examination of the extent of pronation or supination, a distance of 10 inches between parallel feet is preferred because the angle between the lower leg and calcaneus tends to be zero at this distance; therefore, deviations can be more easily seen. The body weight should be evenly distributed during the examination since shifting the weight to one foot increases pronation of that foot. In most people the right foot is more pronated than the left foot.

The manual goniometer can be used for automatic recording or quick direct measuring of angles, and was found to be nearly as accurate a means of measurement as the time-consuming photographic method. Electrogoniometers for other joints are being developed. This device opens a new avenue for study of normal and abnormal joints in motion.

Refractory Period of Human Muscle after the Passage of a Propagated Action Potential

Thomas W. Farmer, Fritz Buchthal, and Poul Rosenfalck (Institute of Neurophysiology, University of Copenhagen, Denmark), ELECTROENCEPHALOGRAPHY, MONTREAL, 12:455-466, May 1960

The refractory period of human muscle was determined by passing stimuli through a bipolar needle inserted into the distal portion of the muscle outside the end plate zone. The electrode which recorded the action potential was inserted about 15 to 25 millimeters, proximal to the stimulating electrode. Paired stimuli with varying time intervals were used. The experiments were performed on the biceps brachii and tibialis anterior muscles of 24 human subjects.

The absolute refractory periods were 2.2 to 4.6 milliseconds, and seemed to fall into two discrete groups. The refractory periods increased with increasing repetition of paired stimuli.

The upper frequency limit, to which a muscle fiber can respond with a propagated action potential, is determined by the refractory period. Stimulation frequencies of 340 to 220 per second gave responses accordingly; but only when short trains of impulses lasting 0.2 to 0.8 of a second were used. At frequencies exceeding 340 per second, only every second impulse evoked a response, even in the beginning of a train. These figures apply to a stimulus well above the threshold. At the threshold level, the upper limiting response frequency was as low as 40 per second.

Traumatic Compression Fractures of the Dorsolumbar Portion of the Spine

A. A. Savastano (Fracture Service, Rhode Island Hospital, Providence, Rhode Island), and John G. Pierik, J. INTERNAT. COLL. SURGEONS, 34: 93-101, July 1960

In this study of 159 dorsolumbar traumatic compression fractures, admitted to the Fracture Service of the Rhode Island Hospital from 1953 through 1957, an analysis of all the cases is presented, in terms of age, sex, occupation, cause of injury, and type of treatment. Final results of 40 of the cases were obtained. Cases of unstable fracture, fracture-dislocation, pathologic fracture, and concomitant lesions of the spinal cord were omitted from the study.

Fractures of the lumbodorsal vertebral bodies, as classified by Watson-Jones in terms of direction of violence and stability, are presented. Two methods of treatment are discussed. The functional method refers to treatment without reduction, without support, or with a simple canvas support. Treatment with reduction, followed by the use of plaster jackets or other types of immobilization, is considered the non-functional method.

The anatomic aspects of the spine are discussed with special reference to the dorsolumbar region and the historical considerations concerning treatment. Prior to 1929, the treatment of compression fractures of the vertebrae consisted essentially of prolonged bed rest, followed by long periods of wearing plaster jackets or cumbersome braces. Various methods of reducing the compressed vertebrae are cited. Early ambulation, with the spine held in hyperextension, was advocated in 1933. In the middle 1940's it became obvious that prolonged immobilization was conducive to stiffness and muscular atrophy, resulting in limited motion and pain. Early ambulation without reduction and without support, but with muscle exercise and other forms of physical therapy, were tried with good results. In 1945, E. A. Nicoll reported his results of treating compression fractures without support and without reduction. This type of treatment consisted of one to three weeks of bed rest; and after the acute pain subsided, the patient was permitted to practice back extension exercises. This was then followed by more intensive exercises in a physical therapy department. Nicoll's patients generally recovered sufficiently to be able to return to work in two to three months.

In the Rhode Island Hospital series, none of the patients underwent reduction of the compressed vertebra under anesthesia. The authors' conclusions are: (1) those patients treated with the functional method had shorter hospitalization, and returned to work sooner, than those treated in non-functional method; (2) the majority of the patients returned to their former occupations, regardles of the type of treatment chosen; and (3) the 1st lumbar and 12th thoracic dorsal vertebrae are the most frequently injured.

Lumbar Disc Protrusions in Pregnancy

J. E. A. O'Connell (St. Bartholomew's Hospital, London), J. NEUR., LOND., 23:138-141, May 1960

The author reviews the records of 347 women with surgically proved lumbar intertebral disc protrusions.

Thirty-nine per cent of the women in this series, who had borne one or more children, developed symptoms of a disc protrusion in pregnancy, or during the period shortly after delivery. This suggests that pregnancy is an etiologic factor in the development of lumbar disc protrusions in women.

Of the 70 women in the series with symptoms of this condition, 12 had a severe or a moderate degree of lower limb paresis, involving the ankle and, occasionally, the knee and hip joints. In one-quarter of these patients the paresis developed early in the postdelivery period.

The possibility of a lumbar disc protrusion being responsible for maternal obstetrical palsy should be considered before the defect is assumed to result from lumbosacral plexus injury.

The Approach to Patients with Functional Disorders

Philip A. Tumulty (Department of Medicine, John Hopkins Hospital, Baltimore, Maryland), NEW ENGLAND J. M., 263:123-128, July 21, 1960

Man is a composite of materials that can be measured by physical means and of intrinsic controlling forces that cannot. Illness originating in either part will affect the whole individual. A disorder which seriously affects man's physical state, but originates within the other forces, is commonly referred to as a "functional" or "emotional" disorder.

It is frequently difficult and sometimes quite impossible to determine exactly whether a particular illness is emotional or organic in origin. There are certain diagnostic procedures to avoid in the study of patients with functional disorders, since their use occasionally lead to an increase in symptoms or the development of a new set of complaints. These procedures include exploratory surgery, spinal punctures, myelography, and infiltration of peripheral nerves.

After an examination has been completed and the disorder has been found to be functional, the patient should be told the result of the test and their significance. The difference between organic and functional illness should be simply explained to the patient in a direct and uncompromising manner. It is important not only to describe what functional disease is, but also what it is not. The nature of functional disease is usually readily understood when presented to the patient as a disorder of the "automatic" nervous system that controls and coordinates the function of all the organ systems of the body.

The next step is to outline for the patient what he must accomplish to overcome emotional illness. The patient must develop an understanding of the nature and meaning of functional illness, (2) accept without reservation the assurance given him that his illness is emotional and not some unrecognized organic process, (3) acquire an understanding of the total factors, both within and without himself, that have led to this illness, (4) study what can be done about these factors and (5) if the patient is unable to recognize these factors, or is unable to modify them, he must seek help from someone trained in these matters.

Effective accomplishment of this approach to patients with functional disorders places heavy demands upon the physician. He must be able not only to exclude with skill and certainty important organic disease from problems that are often highly complex, but he must also be able to induce the frequently reluctant patient to accept and pursue a therapeutic program based upon firm self-discipline. No other clinical problem requires more of the physician.

Plastic Surgery: The Hand (Concluded)

Bradford Cannon and Erle Peacock, Jr. (Harvard Medical School, Cambridge, Massachusetts), N. ENGLAND J. M., 263:238-242, August 4, 1960

One of the most disabling injuries to the hand is a crushing blow that causes destruction of the skin, multiple fractures, and tearing of tendons and nerves. Thorough early debridement of devitalized tissue and a temporary skin graft are of utmost importance. This procedure should be followed by careful splinting, early mobilization, and late replacement of missing tendons, bones, and nerves.

A major loss to hand function occurs when a thumb is amputated. By transposing a digit for the thumb, three goals are accomplished: preservation of sensation, stability, and independency of movement. When the finger is shifted it remains identified in the patient's mind as a finger, but when the thumb tendons are attached to the intact finger tendons, the thumb looses its identity as a finger.

A tendon transplant to accomplish opposition of the thumb should go diagonally across the thenar eminence. Flynn suggests a modification of the transplants performed by Bunnell and Thompson; a method that abducts the thumb to a greater degree, allowing the grasp of larger objects. Flynn uses the flexor sublimis of the ring finger for motor power. The two slips of the tendon are cut just proximal to their distal insertions, and withdrawn at the wrist. The sublimis tendon is inserted through a slit in the tendon of the flexor carpi ulnaris and carried back across the palm. One slip is inserted into the abductor pollicis brevis and the other into the extensor pollics longus. The two sublimis slips are then sutured together with sufficient tension to hold the thumb up from the palm.

A skillful surgeon is frequently unable to restore motion to the hand because of deep scarring. Neither the cells that pull the wound together nor the stimulus responsible for their action has been identified. However, it is known that there is a change within the molecules of collagen in stiff joints. Attention should be paid to the mechanism and eventual control of collagen formation. Substances that will destroy or reabsorb collagen should be investigated. New filters for collagen should be developed.

The Changing Role of Public Health Nursing Services in the Rehabilitation of Patients

Thelma M. Holmes (Rochester, New York), NURS. OUTLOOK, 8:380-382, July 1960

A physical therapy and rehabiltation unit was organized in 1950 within the framework of The Visiting Nurse Service of Rochester and Monroe County, New York. The staff was composed of one physical therapist and three orthopedic nurses. Referrals to this voluntary agency have progressively increased, and the rehabilitation staff now includes five physical therapists and four nurses. One physical therapist and one rehabilitation nurse are assigned to visit in each of the geographic areas into which the agency has been divided. The agency's medical advisory committee approves emergency and standing orders, and accepts problems on referrals.

The physical therapy supervisor is directly responsible for the rehabilitation staff and for consultation with the general nursing staff. Rehabilitation nurses are chosen from the general nursing staff after a minimum of one year of service with the staff; and selection criteria include interest in rehabilitation and teaching ability. Orientation of the rehabilitation nurse candidate is the responsiblity of the physical therapy supervisor. It includes fostering an understanding of the physical therapist's professional education and role, as well as the specific function of the rehabilitation nurse and her relationship to the physical therapist. Thirty-five hours of formal classes include instruction, demonstration, and practice in exercise, elevation activities, gait, and activities of daily living. Field work in the company of an experienced physical therapist follows class instruction.

Office consultations, field visits, and supervisory visits by the physical therapy supervisor are continuing facets of the rehabilitation nurse's program. These decrease in frequency during the first three months of assignment to the unit. After six months, the rehabilitation nurse attends a three or four week course in rehabilitation technics at the Institute of Physical Medicine and Rehabilitation in New York.

Prescriptions involving skills intrinsic to physical therapy, such as electrical stimulation or muscle evaluation, are referred to the physical therapist. If the prescribed treatment can be satisfactorily carried out by a rehabilitation nurse under the supervision of the physical therapist, it is assigned to her. Minor nursing procedures may be carried out by the rehabilitation nurse which makes a second daily visit by a general nurse unnecesary.

Effect of Position Changes on the Intensity and Frequency of Contractions During Labor

Roberto Caldeyso-Barcia et al. (Montivedeo, Uraguay), SURG. GYN. OBST., 80:284-290, August 1960

The effect of the changes in position of pregnant women on uterine contractility during labor were studied by means of recording the pressure of the amniotic fluid in 42 spontaneous labors and in 42 labors induced with oxytocin infusion.

Thirty-nine patients were in prelabor and the remaining 45 were in the first stage of labor. Excluded from this study were patients having complications such as ruptured membranes or who received medications during the period in which the study was made. Patients with emotional disturbances were also excluded.

The results of a qualitative study on body position changes were expressed in the law of position which states that when the patient lies on the side, either right or left, uterine contractions have a greater intensity and a lower frequency than when the patient lies on the back.

The effects of the patient's position changes appeared immediately and lasted for as long as the new position was maintained. This held true in 90 percent of the spontaneous labors and 76 percent of those labors induced with oxytocin infusion.

The mechanisms by which these position changes had such effects on uterine contractility are unknown. Neither parity, the status of the membranes nor the position of the fetus had any influence on this mechanism.

Finally characteristics of these contractions suggested that those produced in the sidelying position should be the most efficient for the progress of labor.

Abstracters for December

The Editorial Board of the *Physical Therapy Review* is indebted to the following Association members for assistance in the preparation of abstracts in this issue:

Mary Jane Hayes
Geraldine Midgeley
Miriam Partridge
Virginia Wirtz

Book Reviews . . .

Anatomy: A Regional Study of Human Structure. By Ernest Gardner, M.D., Wayne State University; Donald J. Gray, Ph.D., Stanford University; and Ronan O'Rahilly, M.D., Wayne State University. Cloth, illus., 999 pp. Philadelphia: W. B. Saunders Company, 1960. $15.00.

This textbook of anatomy is presented with the stated purpose of providing "a textbook that is sufficiently brief for the undergraduate medical student during the present shortened course in human anatomy." To achieve this purpose the authors have deliberately limited a great deal of specific material and detail found in many other anatomy texts. The fields of neuroanatomy, histology, embryology and comparative anatomy are largely omitted or curtailed; and variations of structure and anomilies are only briefly mentioned .

The plan of the book is based on a regional approach to dissection rather than consideration of total systems at one time. The first section is devoted to general considerations of bones, joints, muscles, nerves, vascular structures, and skin as tissues. Such an approach provides an excellent introduction to the study of anatomy by providing the student with material relating to similarities and differences of tissues and an understanding of the interrelationships between cellular structures. Such a scheme gives the student a sound basis for a better understanding of not only structure but also, and of greater importance, function.

The sections, arranged by region, then deal with structure, function, related histology, and surface anatomy. This latter feature is one of the best in the text emphasizing as it does the importance of relating cadaver knowledge to actual patient contact. The one serious omission here, however, is a total lack of any illustrative material for this very important area. Some well done photographs would have added tremendously to the usefulness of every descriptive chapter on surface anatomy. Chapter 38 is the only place where drawings of surface anatomy appear, and these are merely line drawings and so stylized as to be confusing.

There are numerous other illustrations which are well placed so as to directly supplement the text. However, with the exception of radiographs, they are all black and white line drawings and diagrams, most of which are quite useful, however. The more complicated ones are difficult to use because of color limitations; and many, purporting to demonstrate function, lose their effectiveness because the three-dimensional relationships are lost. Figures 13 to 19 demonstrate this fault clearly.

The type face is easily read and the quality of paper and binding is good.

This book's greatest usefulness will undoubtedly be for the student in basic anatomy, as stated by the authors. However, its value as a reference text for the advanced student or for persons interested in depth of factual material in specific areas is definitely limited.

Kinesiology: The Anatomic and Mechanical Fundamentals of Human Motion. Ed. 3

By Katharine F. Wells, Ph.D., Associate Professor of Physical Education, Wellesley College. Cloth, illus., 515 pp. Philadelphia: W. B. Saunders Company, 1960. $5.75.

Kinesiology was originally published in 1950 and was revised in 1955. The third edition now appears for the purpose of including the data obtained in recent years from electromyographic studies as a basis for verifying and correcting muscular actions.

The book is designed to serve as a text for a full year's course in kinesiology. The author identifies and ably demonstrates her philosophy of effective teaching by guiding and directing the students into purposeful activities. To communicate this to her readers, she follows each instructional unit with a series of demonstrations and laboratory exercises, and frequently includes supplementary material from observations in the literature. The inquiring student and the novice instructor will welcome the bibliography and recommended readings at the end of each chapter. The basic format and original four main parts remain unchanged.

Part 1 is devoted to descriptions of the musculoskeletal anatomy and covers over half of the text. A brief orientation to basic kinesiological concepts and a sketchy introduction to neuromuscular and physiological principles are included.

Part 2 deals with the application of the principles of mechanics to human motion. The musculoskeletal counterparts of the pulley, lever, wheel, and axle are clearly described together with the fundamental principles of motion and a discussion of force and work.

Part 3 discusses the underlying principles of basic motor skills with special emphasis on body mechanics in sport activities and prevention of injury.

Part 4 deals in a general manner with the application of kinesiological principles over a wide scope of specialized activities, including locomotion; teaching of sports; selection and evaluation of exercises for conditioning and corrective exercises; physical and occupational therapies; and daily life skills.

The style of the book is simple and its clarity is enhanced by numerous illustrations. The section on applications of kinesiology to physical and occupational therapy has been enlarged; for example, activities of daily living (ADL) testing, and training and stretching technics are introduced. The section on muscle reeducation is now devoted exclusively to resistance exercise and the occupational therapy area has been rewritten and increased in scope. Except for enlarging the overview for the prospective student in these two fields, the additional material here seems to be of little value.

Although this edition was prompted by an increase in available electromyogram (EMG) data, one wonders why the author omitted some of the more widely accepted studies of significance. This is particularly obvious in the shoulder area by the absence of the Inman, Saunders, and Abbott studies. In general, this new material is found primarily in the supplementary sections and has not been integrated into the discussion. In the early chapter the author briefly introduces such complex concepts as stretch reflex, postural reflex, spasticity, and reciprocal innervation, but then sets them aside, undeveloped and unrelated to the text that follows. It is here that books written for the physical education student fail to take the physical therapy student far enough in his quest for understanding the complexities of neuromuscular function.

The material on the function of the gluteus medius muscle would

probably benefit by revision. It is curious to note that the inaccurate description of the gluteus medius gait was not revised in this edition.

This book will serve the physical therapy student best as a supplementary text, particularly in the area of mechanics of human motion.

The Extremities. Ed. 2. By Daniel P. Quiring, Ph.D., Late Head of the Anatomy Division, Cleveland Clinic Foundation and Associate Professor of Biology, Western Reserve University. Revised and edited by John H. Warfel, Ph.D., Assistant Professor of Anatomy, University of Buffalo, School of Medicine, Buffalo, New York. Cloth, illus., 120 pp. Philadelphia: Lea & Febiger, 1960. $3.25.

The format of this second edition remains the same as that used originally by Dr. Quiring and his coauthors. This revision was made by Dr. Warfel, chiefly to change the reference pages to the 27th edition of *Gray's Anatomy;* to change the names of some of the muscles to conform with *Nomina Anatomica* (Paris 1955); to correct anatomical errors in a few plates; and to make a slight change in the order of presentation.

The purpose of the text, as stated in the first edition, is to make clear to the student the origin, insertion, action, nerve supply, and blood supply of the skeletal muscles of the limbs, by means of diagram and concise description. Details and the relationship of structures are omitted, but reference pages in *Gray's Anatomy* and in Cunningham's *Textbook of Anatomy* are given for each muscle.

The diagrammatic representation consists of the part of the skeleton related to the particular muscle, designation of the origin and insertion on the skeleton, the shape of the muscle, the partial pathway of the nerve and blood vessels which supply the muscle, and the motor point of the muscle. The description of each muscle includes a brief statement of the origin, the insertion, the function, and the nerve and blood supply. The diagrams are based on actual dissections, with reference to standard anatomical texts. The elimination of the details of the attachments of some of the muscles, such as the trapezius, the interossei, and lumbricales, fails to give the student the necessary information for understanding the function.

The author gives the student a general understanding of the attachments and position of the muscles. The function, however, is covered only from the standpoint of the moving action. No attempt has been made to show the very important stabilizing function of muscles, or to give an understanding of the actions of muscles of the lower limb when one is weight-bearing. Thus, the text gives the student only a limited understanding of muscle function.

The illustrations are presented clearly and concisely; and the text, therefore, will be of value to therapists as a reference in reviewing the origin, the insertion, and the nerve and blood supply of muscles.

Cates' Primary Anatomy. Ed. 4. By J. V. Basmajian M.D. Professor of Anatomy, Queen's University, Kingston, Ontario. Cloth, illus., 360 pp. Baltimore: The Williams and Wilkins Co., 1960. $6.50.

The development of a textbook of elementary anatomy designed to meet the needs of students of physical therapy, nursing, occupational therapy, and physical education is difficult. The author must possess extensive knowledge of the subject and of teaching methods so that the necessary decisions of simplification, condensation, and emphasis can be made. Dr. Basmajian has chosen to present a concise abbreviation of the detailed subject, and has avoided the pat impressions so often left by over simplification.

The text is written in a narrative and semi-outline form with effective utilization of bold type for paragraphing and key word emphasis. Both the subject of anatomy as well as the specific topics are approached from a general view before proceeding to the details, with terminology defined prior to its use. A great deal of dependence is placed on the illustrations (over 500). The majority are schematic diagrams which aid in comprehension of the material. The addition of a number of these diagrams, as well as a revision of the chapter on the nervous system, are the major changes of this edition.

Two-thirds of the book is devoted to the skeletal, articular, muscular, and nervous systems. The digestive, respiratory, circulatory, genitourinary, endocrine, integumentary systems, and the special senses receive less emphasis. A better understanding of the gross anatomic aspects is aided by the inclusion of some embryologic and histologic material. The student is frequently reminded of the purpose of morphologic study through functional and pathologic examples.

Teachers of undergraduate anatomy who are considering textbooks for their brevity and accuracy in supplementing lecture, reference, and laboratory material, would do well to review this book.

Annual Review of Physiology. Vol. 22. Victor E. Hall, Editor, University of California at Los Angeles. Frederick A. Fuhrman and Arthur C. Giese, Associate Editors, Stanford University. Cloth, 725 pp. Palo Alto, California: Annual Reviews, Inc., 1960. $7.00.

This new volume in the *Annual Review* series contains fewer articles of direct importance to the field of physical therapy than usual. However, this is compensated by the quality of the individual contributions. The most important of these is probably the review on nerve excitation and synaptic transmission by Syropoulos and Tasaki. These authors have contributed very actively to this field and their review is notably more analytical than is commonly expected in this series. (The findings of A. V. Hill on the biphasic curve of nerve heat have been included in this chapter.) The somatic functions of the nervous system have been quite extensively reviewed in the chapter by Drs. Segundo and Galeano of Uruguay. Of considerable importance is the article by Neff and Goldberg on the so called "higher" functions of the nervous system. Here again, the authors are active investigators in this field, evidenced by their review.

As has been the custom in previous years, this volume of *Annual Reviews* carries a preface by an elder statesman of Physiology. This year it is Dr. Franklin C. McLean, Emeritus Professor of Pathological Physiology at the University of Chicago. Still active in research today, Dr. McLean has served both as Professor of Medicine and Professor of Physiology. In outlining his own career he shows the development of Medicine as an academic subject. This is probably one of the most personal of these pref-

aces that have been written. In following his own career, the author portrays a vivid picture of the coming of age of academic medicine, as compared to physiology which has a much older academic background.

Whillis' Elementary Anatomy and Physiology, Ed. 4. By Roger Warwick, Ph.D., M.D., Professor of Anatomy, Guy's Hospital Medical School, University of London. Cloth, illus., 274 pp. Boston: Little, Brown & Company, 1960. $6.00.

James Whillis wrote the first edition of this text for the student of elementary anatomy. Physiology was added to make the study of the structure of the human body more interesting. Unlike other books that carry the title of Elementary Anatomy and Physiology, this is one-third the usual length simply because it does not attempt to cover the subject matter of both areas of knowledge. Physiologic excerpts were added to enhance the student's motivation. Physiology is in no way comprehensively covered.

The author of the fourth edition, Roger Warwick, is a physician and an anatomist who has a genuine desire to maintain the major objectives of this text. He has greatly improved the readability of the fourth edition, but yet preserved the original character. There have been some changes in format, an addition of recent information, and an enlargement of the section on muscular function.

The plan of this elementary text is quite pleasing. It is a well written, clearly illustrated anatomy reference of 262 pages plus an index. There are 107 illustrations of a semi-diagrammatic type, large, distinct, and uncomplicated. Only the fundamentals are stressed. Care has been taken to bold-type all headings and the important words throughout the content. This adds much to the ease with which a student can use this as a manual. It is important to note, however, that this reference is for convenience and not for detail. For example, the following quotation is an illustration of the brevity: "Flexion (bringing the leg forward) is produced by the psoas and iliacus muscles which cross the front of the joint." It will be noted that the origin or the insertion of the muscles was not given.

For some personnel of the ancillary medical professions this book may be of value as a handbook. For the physical therapy student it would not suffice. It could, however, be used as a quick reference together with a more detailed anatomy text and lecture notes. It should not be considered as a physiology reference.

Office Orthopedics. Ed. 3. By Lewis Cozen, M.D., F.A.C.S., attending Orthopedic Surgeon, Cedars of Lebanon Hospital, Los Angeles; Chief of Orthopedic Service, City of Hope Hospital, Duarte, California; Assistant Professor of Orthopedic Surgery, College of Medical Evangelists, Los Angeles. Cloth, illus., 430 pp. Philadelphia: Lea & Febiger, 1959. $9.50.

Dr. Lewis Cozen, an experienced orthopedic surgeon, has presented his third edition of "Office Orthopedics." The author describes the type of diagnostic and therapeutic procedures carried out in the orthopedist's office or clinic in treating ambulatory patients. Surgical procedures are not included. This book is intended primarily for physicians who are not orthopedists, but who treat patients with orthopedic disabilities. It also may be of some value as a reference book for physical and occupational therapists.

The book is divided into three major sections. Section I includes a potpourri of chapters: Materials (for casting and splinting), Physical Therapy, Local Anesthesia, and a brief chapter on Prosthesis Fitting. The chapter on Physical Therapy is particularly disappointing in that the author does not stress the value of therapeutic exercise in the treatment of patients with orthopedic disabilities. This chapter deals mainly with modality therapy, and touches lightly on progressive resistance exercise, crutch management, and assistive devices.

Section II includes, mainly, descriptions of treatment procedures for orthopedic disabilities involving different regions of the body. There are many references to mobilization and immobilization procedures. These do include a frequent but brief description of specific therapeutic exercises, as well as many interesting and clearly-illustrated methods of splinting and supporting.

Section III deals with the diagnostic problems of a wide range of disabilities in children and adults.

The book is extremely well illustrated with simple line drawings and pertinent photographs. Most chapters are well documented with useful references.

The reviews published here do not necessarily represent the opinions of the American Physical Therapy Association.

Book Reviewers for December

H. D. Bouman, M.D., Editor, *American Journal of Physical Medicine*; Professor of Physical Medicine, University of Wisconsin, Madison.

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Physical Therapy Strengthens Small Hospital Services. W. Leon Hisle. Mod. Hosp., 95:123, September 1960

Why the Nursing Supply is Failing to Meet the Demand. Thomas Hale. Mod. Hosp., 95:101-104, 130-131, September 1960

Circulation

Phlebitis. John J. Byrne. J. Am. M. Ass., 174:113, September 10, 1960

The Treatment of Acute Volkmann's Ischemia. J. L. Kihm, J. Hammer, R. E. DeLong, and R. L. Johnston. J. Michigan M. Soc., 59:1195-1199, August 1960

Electrotherapy

Radio-Frequency Radiation. Occasional Survey. Lancet, Lond., 2:484-486, August 27, 1960

Neurology

Cervical Disc Protrusions with Compression of the Spinal Cord—Report of a Case. Q. Hook, H. Lidvall, and K. Anstrom. Neurology, 10:834-841, September 1960

Improvement in Cutaneous Sensibility Associated with Relief of Pain. P. W. Nathan. J. Neur., Lond., 23: 202-206, August 1960

Spinal Withdrawal Reflexes in the Human Lower Limbs. K. E. Hagbarth. J. Neur., Lond., 23:222-227, August 1960

Studies of Tone, Tremor, and Speech in Normal Persons and Parkinsonian Patients. B. Boshes, H. Wachs, et al. Neurology, 10:805-813 September 1960

Spinal Tracts Mediating Subthalamic Hyperkinesia: Physiological Effects of Selective Partial Cordotomies upon Dyskinesia in Rhesus Monkey. Malcolm B. Carpenter, James W. Correll and Alanson Hinman, J. Neurophysiol., 23:288-304, May 1960

Sweat Iodide Excretion in Patients with Cystic Fibrosis of the Pancreas. J. S. Brodkey and G. E. Gibbs, J. Appl. Physiol., 15:501-502, May 1960

The Concentration of Electrolytes in the Developing Nervous System with Special Reference to the Period of Myelination. Mieczyslaw Wender and Marian Hierowski, J. Neurochemistry, 5:105-108, February 1960

The Babinski Sign. Mark Szapiro. J. Neur., Lond., 23:262-263, August 1960

The Value of Early Decompression of the Paralyzed Facial Nerve. David Wasserman. Arch. Otolar., 72: 333, September 1960

Neurosurgery

Neurosurgery in the Soviet Union. James L. Poppen. J. Neurosurg., 17:572-582, July 1960

Neurosurgical Aspects of Seventh Nerve Neurilemmoma. Leonard T. Furlos. J. Neurosurg., 17:721-735, July 1960

Orthopedics

Orthopedic Problems in Children. Jacob F. Katz. Surg. Clin. N. Am., 40:1051, August 1960

Recurrent Dislocation of the Shoulder. E. A. Brav. Am. J. Surg., 100:423-429, September 1960

Repair of Contractures of the Hand with Pedal Full-Thickness Skin Graft. S. Glanz. Am J. Surg., 100:412-415, September 1960

Spondylolisthesis and Spondylolysis: a Clinico-Statistical Report on 598 Cases Treated Over a Thirteen-Year Period. Elias Mago. South. M. J., 53:1096-1100, September 1960

Management of Fractures of the Femur in Elderly Patients. R. Prothero, R. First, and J. Mithoefer. Surg. Clin. N. Am., 40:899, August 1960

The Total Approach to Surgical Treatment of Acute Hand Injuries. M. Leon Canick. N. Y. State J. M., 60:3083-3094, October 1960

Pediatrics

Recent Concepts in Physiology and Pathology of the Newborn. P. Schwartz. Arch. Pediat., N. Y., 77:353-356, September 1960

Physical Medicine

Physical Medicine: IV. Massage and Electric Stimulation. John Bedford. Northwest. M., 59:1142-1147, September 1960

Selection of Wheel Chairs: Custom Models. Edward Lowman and Howard Rusk. Postgrad. M., 28:308, September 1960

Physiology

Breathing in Brief Exercise. F. N. Craig and E. G. Cummings. J. Appl. Physiol., 15:583-588, July 1960

Electrical and Mechanical Factors in the Adaptation of Mammalian Muscle Spindle. O. C. J. Lippold, J. G. Nicholls, and J. W. T. Redfearn. J. Physiol., Lond., 153:209-217, September 1960

Pathology and Pathogenesis of the Diffuse Collagen Diseases. Part I. H. Z. Movat. Canad. M. Ass. J., 83: 683-689, September 24, 1960

Pathology and Pathogenesis of the Diffuse Collagen Diseases. Part II. Canad. M. Ass. J., 83:747-753, October 1, 1960.

Properties of Cutaneous Touch Receptors in Cat. C. C. Hunt and A. K. McIntyre. J. Physiol., Lond., 153: 88-98, August 1960

Proteinuria During the 24-Hour Period Following Exercise. R. D. Caye and R. R. Rosendich. J. Appl. Physiol., 15:592-594, July 1960

Spinal Reflex Mechanisms Concerned with Skeletal Muscle. C. C. Hunt and E. R. Perl. Phys. Rev., 40:538, July 1960

Respiration

Mechanical Work of Breathing During Muscular Exercise. R. Margaria, G. Milic-Emil, J. M. Petit and G. Cavagna, J. Appl. Physiol., 15:354-358, May 1960

The Effect of Intermittent Positive Pressure Breathing on the Lung Compliance and Intrapulmonary Mixing of Gases. P. A. Emerson, G. E. Torres and Harold A. Lyons, Thorax, 15:124-130, June 1960

Miscellaneous

College Students' Attitudes Toward the Professions. Donald P. Laboskey, J. Am. Diet. Ass., 37:13-15, July 1960

Science and Human Welfare. Committee on Science in the Promotion of Human Welfare of the AAAS, Science, 132:68-73, July 8, 1960

The Role of the Aged in American Society. Mel J. Ravitz, Indust. Nurses, 8:22-25, June 1960

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PHYSICAL THERAPIST, APTA, registered with experience to work in modern department of new 222-bed general hospital. Five-day, 40-hour week with good personnel policies. Salary open. Send resume and salary requirement to Personnel Director, Providence Hospital, 1233 Main Street, Holyoke, Mass.

MIDDLE ATLANTIC

PHYSICAL THERAPIST, $4740-$5790, liberal benefits. Comprehensive rehabilitation 200 patients, all ages. 40 physical therapists. Large teaching program. Beautiful location 30 miles from Times Square. Full maintenance available for single person at $500 per year. Morton Hoberman, M.D., Physiatrist, New York State Rehabilitation Hospital, West Haverstraw, N. Y.

STAFF THERAPISTS—N.Y.U. Medical Center affiliated hospital. Diversified experience offered: General Physical Therapy, Rehabilitation, and Respirator Sections. $4680-5580 with annual increments. Liberal vacation, sick leave policy. Write Department PM&R, Goldwater Memorial Hospital, Welfare Island, New York 17, N. Y.

APPLICATIONS CONTINUALLY ACCEPTED for staff therapists in rehabilitation hospital treating children and adults. Addition completed recently includes complete new P.T. department. Current staff of seven is being gradually increased to meet greater in- and out-patient capacity. Progressive personnel policies. Salary commensurate with experience and training. Location ideal for cultural interests and all sports. Further information and attractive brochure furnished on request. Apply to Administrator, Sunnyview Orthopaedic and Rehabilitation Center, Inc., 124 Rosa Road, Schenectady 8, N. Y.

PHYSICAL THERAPISTS: For general hospital near N.Y.C. Affiliated residency N.Y.U.-Bellevue, active physical medicine and rehabilitation program. Must be eligible for registration in N.Y. State. Liberal benefits. Start $4420 with yearly increments of $290 to $5290. Contact Personnel Supervisor, Grasslands Hospital, Valhalla, N.Y. LY 2-8500, Ext. 61.

Staff Physical Therapists—opportunity to work in expanding rehabilitation department in 518-bed general hospital under direction of Physiatrist; wide variety of cases; 5-day week; good starting salary with regular increments and liberal fringe benefits. Apply Personnel Department, St. Joseph's Hospital, Paterson, New Jersey.

Wanted: Physical Therapist, 684-bed General Hospital. Contact Robert S. Foster, Chief Physical Therapist, Harrisburg Hospital, Harrisburg, Pa.

Registered Physical Therapist with good educational and work background. Interesting position with large progressive metropolitan hospital. Excellent working conditions and benefits. Salary commensurate with ability. Good advancement. Write Mr. Joseph H. Kay, Personnel Director, Montefiore Hospital, Bronx 67, N. Y.

QUALIFIED PHYSICAL THERAPIST. Recent graduate accepted. Residential Center providing intensive treatment for 40 C.P. children. Salary open. Good personnel policies. August vacation and Christmas holidays. Apply Director, 4400 Baltimore Avenue, Philadelphia 4, Pa.

STAFF THERAPISTS—SENIOR THERAPIST: for modern N.Y.U. affiliate P.M.R. Dept.; fine teaching program. Dr. L. Kaplan, Professor, N.Y.U. Director. Staff Salary: $4585 to and including $5516 with annual increments of $180. Senior Therapist: $5527.25 to and including $6820.65 with annual increments of $240. 1 mo. paid vacation; other liberal benefits. 20 mins. Times Sq. Contact J. R. Schattner, Chief Physical Therapist, City Hosp. at Elmhurst, 79-01 B'way, Elmhurst 73, N. Y. DE 5-3200, Ext. 241.

Registered Physical Therapist wanted immediately for a 228-bed hospital. Standard 40-hour work week. Liberal vacation allowance, paid hospitalization, retirement plan and other benefits. Meals furnished. Salary open. Apply Personnel Office, Roosevelt Hospital, P.O. Box 151, Metuchen, New Jersey.

IMMEDIATE OPENINGS for two qualified Physical Therapists (Male-Female) in a department of a 450-bed general hospital. Three weeks vacation, sick leave, five day week, active inservice educational program. Starting salary $4628 for new graduates, $4784 for experienced therapists. Contact Cora Alice Taylor, Coordinator, Department of Physical Medicine and Rehabilitation, The Roosevelt Hospital, New York 19, New York.

SOUTH ATLANTIC

WANTED IMMEDIATELY: Two (2) Staff Physical Therapists, expanding department of an orthopaedic clinic. Department under direction of a physiatrist. Vacation, sick leave, holidays. Inquire: Arthur E. White, M.D., Anderson Clinic, South 25th Street & Army-Navy Drive, Arlington, Va.

STAFF P.T.'s—Curtis Hixon Rehabilitation Center, Salary range $3993 to $5555. Reply: Rehabilitation Coordinator, Tampa General Hospital, Tampa 6, Fla.

OPPORTUNITY for a staff physical therapist in a 30-bed Children's Rehabilitation Center. Close contact maintained with 500-bed University Hospital. Good working conditions and liberal benefits. Pleasant community located in foothills of the Blue Ridge Mountains. Contact Francis N. Gay, Assistant Director of Personnel, University of Virginia, 1416 West Main St., Charlottesville, Va.

Positions Available

S. ATLANTIC (con't)

Staff Physical Therapist, female—Treatment Center, Florida East Coast. Variety of cases. Address replies to: Box 300, c/o The Physical Therapy Review, 1790 Broadway, New York 19, New York.

PHYSICAL THERAPY CONSULTANT: State Crippled Children's Program; P.T. Clinics held in various health departments. Merit System Status; retirement benefits; liberal vacation and sick leave. Salary range $4920–$6144. Travel expenses paid. Responsible, challenging, and secure position. Write: Director of Personnel, State Health Department, Richmond, Va.

IMMEDIATE OPENINGS available for qualified physical therapists in 400-bed general medical and surgical teaching hospital. All work under supervision fulltime physiatrist. Salary commensurate with experience. For further details write Charles S. Wise, M.D., Director, Department of Physical Medicine and Rehabilitation, George Washington University Hospital, 901 23d Street N.W., Washington 7, D.C.

WANTED: Qualified physical therapist for a visiting nurse association giving services to patients in their own homes under medical prescription. Good personnel policies. Salary dependent on experience. Write to Miss Gibson, Dir., Visiting Nurse Ass'n, 1842 Mintwood Pl., Washington 9, D.C.

WANTED: Staff physical therapist, female, registered. Private Clinic, new, modern, 20 physicians, varied specialties, 3 general surgeons, 2 orthopedic surgeons, salary dependent upon experience. Usual employee benefits. Apply A. T. Early, Clinic Manager, or Miss Mary Graves, physical therapist, The Nalle Clinic, 1350 South Kings Drive, Charlotte 7, North Carolina.

STAFF THERAPISTS. General Medical and Surgical cases, In- and Outpatient Service. Opportunity for varied experience. Vacation, sick leave, and Social Security benefits. Apply: Mr. Norman Schreck, Coordinator of Rehabilitation Services, and Chief Physical Therapist, Physical Therapy Department, The Johns Hopkins Hospital, Baltimore 5, Md.

STAFF PHYSICAL THERAPIST for expanding and progressive rehabilitation program in Baltimore and Hagerstown, Maryland. Salary: Staff—$4500.00 with annual increments, vacation, and sick leave. New and well equipped clinics, 40-hour week, inpatients only. Apply Dr. Florence Mahoney, Director Rehabilitation Medicine, or Miss Dorothea Barthel, Montebello Hospital, 2201 Argonne Drive, Baltimore 18, Maryland.

PHYSICAL THERAPIST: Staff position, no experience necessary. Work with seven physical therapists, four occupational therapists, and medical social worker in community outpatient treatment and rehabilitation center serving all age groups and disability types. Contact Delaware Curative Workshop, Inc., 16th and Washington Streets, Wilmington 2, Delaware.

STAFF PHYSICAL THERAPIST

New 300-bed General Hospital. Well-equipped, air-conditioned department. 8 holidays, 2 weeks vacation, liberal sick benefits. New graduate acceptable. Apply Personnel Director, Lakeland General Hospital, Lakeland, Florida.

TWO PHYSICAL THERAPISTS: We're moving into our new, air-conditioned, fully-equipped, and greatly enlarged facilities! Two additional therapists needed. Very active department. 40-hour week. Salary commensurate with experience starting at $4800 for recent graduates. Liberal benefits. Please address inquiries to Personnel Director, Greenville General Hospital, 100 Mallard Street, Greenville, S. C.

EAST NORTH CENTRAL

PHYSICAL THERAPIST: For rapidly expanding, new, exceptionally well-equipped, air-conditioned Physical Medicine & Rehabilitation Dept. Under direction of full-time physiatrist. Wide variety of in- and out-patient treatment. Excellent starting salary; liberal benefits; 380-bed general hospital. Contact Dr. Edward P. Reese, Director, Dept. of Physical Medicine & Rehabilitation, Lutheran Hospital, 2609 Franklin Blvd., Cleveland 13, Ohio.

WANTED: STAFF PHYSICAL THERAPIST (Female) Graduation from approved school required. 416-bed general hospital, major expansion program including new Department for Physical Therapy now in progress. Salary range $4200 to $4800. 40-hour work week plus liberal fringe benefits. Apply Personnel Director, Butterworth Hospital, Grand Rapids 3, Michigan.

MALE OR FEMALE registered physical therapist wanted immediately to head department established two years ago in this 170-bed general hospital located in an expanding summer and winter resort area. Salary range $4,800 to $6,240. Apply Administrator, War Memorial Hospital, Sault Ste. Marie, Mich.

STAFF PHYSICAL THERAPIST: 2 openings in comprehensive out-patient rehabilitation center. Excellent program and personnel policies. Starting salary with 2 years experience $5400. Without experience $4900. Contact L. Burke Crowder, Administrator, Community Rehabilitation Clinic, 614 Dartmouth Ave., S.W., Canton 10, Ohio.

PHYSICAL THERAPIST: To take charge of new dept. Contact Dr. Rossi, Hopedale Hospital, Hopedale, Ill.

STAFF PHYSICAL THERAPIST: For 1000-bed General Hospital. Five day week, three weeks vacation, group insurance, and retirement benefits. Daily inservice staff training program. Complete cross-section of medical and surgical disabilities treated. Department under direction of a physiatrist. Write Dr. Wm. C. Schaefer, Division of Physical Medicine and Rehabilitation, Henry Ford Hospital, Detroit 2, Michigan.

Positions Available

E. NORTH CENTRAL (con't)

Positions Available as STAFF PHYSICAL THERAPIST. Salary range $4,800-$5.600. Starting salary based on experience. Merit increases, 40-hour week, 3 weeks vacation, holidays, sick leave, health and life insurance and retirement plans available. Affiliated with Wayne State Univ. Medical School and developing P.T. School. Comprehensive rehabilitation program for inpatients and outpatients and P.T. for 650-bed general hospital. Graduates of approved schools of P.T. and should hold membership in APTA and/or Registry. Contact Mr. John C. Bay, Administrator, Rehabilitation Institute of Metropolitan Detroit, 261 Brady, Detroit 1, Mich.

QUALIFIED PHYSICAL THERAPISTS wanted to serve in 1000-bed, modern hospital for the long-term ill, affiliated with the University of Cincinnati. Physical Medicine Department, well-equipped with modern equipment in all modalities; under direction of physiatrist, P.T., O.T., and A.D.L. sections, in expanding Rehabilitation Program dealing with complete cross-section of medical and surgical problems: arthritis, brain injuries (traumatic, surgical, vascular), cord injuries, neurological disorders, orthopedics, general surgery. Starting salary to $4609.92 with yearly increments. Liberal fringe benefits—8:00 A.M. to 4:00 P.M., 40-hour week; lunch; laundry; paid statutory holidays (10); sick leave (15 days); pension plan; University City on the Ohio River. Apply to Morris L. Stein, M.D., Director, Physical Medicine and Rehabilitation Department, Daniel Drake Memorial Home and Hospital, Galbraith Road, Cincinnati 16, Ohio.

PHYSICAL THERAPIST

To develop and take charge of a newly constructed, well equipped department to be opened January 1, 1961. 400-bed general hospital located in western suburb of Chicago. Excellent opportunity for person well qualified and experienced to direct this important specialty. Direct inquiry to Wendell H. Carlson, Administrator, West Suburban Hospital, 518 North Austin Boulevard, Oak Park, Illinois. Telephone EUclid 3-6200.

PHYSICAL THERAPY POSITIONS available in Institute Departments located in three Peoria hospitals. Excellent education opportunities, both clinical and didactic. Three weeks vacation per year, sick leave, insurance benefits, 6½ holidays per year. Complete physical medicine and rehabilitation program under supervision of physiatrist. Progressive salary scale commensurate with experience and meritorious service. Apply Medical Director, Institute of Physical Medicine and Rehabilitation, 619 N.E. Glen Oak Avenue, Peoria, Ill.

WANTED IMMEDIATELY: Graduate physical therapist (age 25-45) for expanding program of physical therapy for homebound arthritics. Car furnished. Work under supervision of experienced physical therapist. Recent graduate considered. Salary range $4500-$5000, depending on background and experience. Contact: W. Gordon Taylor, Exec. Dir., Arthritis and Rheumatism Foundation, 312 W. 9th St., Cincinnati 2, Ohio.

PHYSICAL THERAPY CONSULTANT—Help develop a new state geriatrics consulation service to local health authorities and nursing-home administrators. Assist in training institutes. Demonstrate physical therapy technics. Need B.S. in Physical Therapy and four years experience, including two in specialized work with elderly, handicapped people. Start at $565. R. J. Siesen, Personnel Officer, State Board of Health, Madison 2, Wis.

STAFF PHYSICAL THERAPIST (female) to work in midwestern 350-bed hospital. In- and outpatient work, 40-hour week. Paid Blue Cross hospitalization, good life insurance and retirement plans. Write Chief Physical Therapist, Trumbull Memorial Hospital, Warren, Ohio.

OPPORTUNITY for REGISTERED PHYSICAL THERAPIST to treat arthritis and multiple sclerosis patients in their homes under medical supervision. Transportation furnished. Competitive salary. Chance for ingenuity in rapidly expanding program. Apply Executive Director, Akron Area Chapter, National Multiple Sclerosis Society, 326 Locust Street, Akron 2, Ohio.

PHYSICAL THERAPIST WANTED, salary dependent upon experience and training; 40-hour week; sick leave; vacation; retirement plan. Pleasant working conditions in 18 man private diagnostic clinic with active orthopedic and physical medicine departments. Associated with 100-bed private hospital in cultured university town in Southern Illinois. Contact The Carbondale Clinic, 404 W. Main Street, Carbondale, Illinois.

Classified WANT-ADS

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IMPORTANT

It is understood and agreed that the publisher shall have the right to reject or change the wording of any advertisement which in the opinion of the Editorial Board shall not be in agreement with the ethical standing of this publication.

Positions Available

E. NORTH CENTRAL (con't)

PHYSICAL THERAPIST $5127 to $5505

Position open for qualified Physical Therapy graduate at Detroit Receiving Hospital and Herman Kiefer Hospital; vacation, sick leave, insurance, retirement, and other benefits. Please contact Detroit Civil Service Commission, 612 City-County Building, Detroit 26, Michigan.

PHYSICAL THERAPY POSITION in the Detroit V.N.A. which provides nursing, physical, occupational, and diet therapy under medical prescription to patients in their own homes. Salary range for experienced worker $4700 to $5800. There are 5 physical therapists, including the supervisor. Excellent personnel policies. Apply to: Visiting Nurse Association, 4421 Woodward Ave., Detroit 1, Michigan.

PHYSICAL THERAPIST: outstanding opportunity in an expanding P. T. Department. Base salary at $6000. Lakeside General Hospital, 995 E. Jefferson Ave., Detroit 7, Michigan.

Registered PHYSICAL THERAPIST for full time work in Visiting Nurse Association rehabilitation program. Requires experienced person with mature judgment. Variety of cases, cooperative relationship with medical centers, teaching program in patients' homes. Five day, 40-hour week, 4 weeks vacation, sick leave, holidays. Salary dependent on qualifications. Community offers excellent cultural and educational opportunities. Apply Miss Janet Price, Assistant Director, The Visiting Nurse Association, 3300 Chester Avenue, Cleveland 14, Ohio.

EAST SOUTH CENTRAL

REG. PHYSICAL THERAPIST: New air-conditioned C. P. outpatient clinic supervised by physiatrist; 40-hr. 5-day wk.; 3-wk. rest period; 13 holidays. Starting salary for inexp. therapist $4,200. Write Adm. Les Passees Center, 49 N. Dunlap, Memphis, Tenn.

CHIEF THERAPIST: registered, with good educational and work background. Excellent position in modern 285-bed hospital offering interesting variety of inpatients and outpatients. 40-hour week, salary range $6000-$7400, liberal personnel policies. Contact H. R. Hughes, Assistant Administrator, St. Joseph Hospital, Lexington, Ky.

WEST SOUTH CENTRAL

OPENING for two registered staff Physical Therapists in modern 800-bed general hospital. Wide variety of patients, forty-hour work week, annual two-week paid vacation, sick leave, salary dependent upon experience. Approved School of Physical Therapy connected with the department. Contact Jack C. Hays, Chief Physical Therapist, Physical Medicine Dept., Baylor University Medical Center of Dallas, 3500 Gaston Ave., Dallas 10, Texas.

WEST SOUTH CENTRAL (con't)

REGISTERED PHYSICAL THERAPIST for new 325-bed general, private hospital. Female. Starting salary $350 monthly. 40-hour week. Department well established and equipped. Excellent personnel policies. Contact: R. C. Herrmann, Personnel Director, T. E. Schumpert Memorial Sanitarium, Shreveport, La.

OPENING FOR EXPERIENCED registered physical therapist (female) Sept. 15th in private Orthopedic Clinic. Salary $400 per month plus yearly bonus. 35-hr. week. Two weeks paid vacation. Contact Graybill-Wilson Orthopedic Clinic, 1202 Arlington, Lawton, Okla.

MOUNTAIN

PHOENIX, ARIZONA—Female registered physical therapist for busy physiatrist office. Write Wm. J. Lajoie, M.D., 2021 N. Central Ave., Phoenix, Arizona.

PACIFIC

GRADUATES OF APPROVED SCHOOLS FOR PHYSICAL THERAPISTS: new legislation provides that you may now practice under professional supervision in California pending registration with the California Board of Medical Examiners. Positions open in State hospitals; the Veterans Home and special schools for handicapped children. No experience required to start at $458 a month. Promotional opportunities; liberal employee benefits. Streamlined civil service examinations twice a month in San Francisco and Los Angeles, and on request in other states near candidate's residence. Write State Personnel Board, P.T. 71, 801 Capitol Avenue, Sacramento 14, Calif.

PHYSICAL THERAPISTS

Supervisory and staff openings. California licenses or eligible. New Rehabilitation Center. Personnel Director, Cedars of Lebanon Hospital, 4833 Fountain Ave., Hollywood 29, Calif.

IMMEDIATE OPENINGS in S.F. Bay Area. Physical Therapists needed to provide services for cerebral palsied children in schools & clinics & to staff a general rehabilitation hospital service. All civil service benefits. Must be Calif. registered or eligible. Salary: $395-481 or $436-530, depending on experience. Write Alameda County Civil Service Commission, 188 12th, Oakland, Calif.

PHYSICAL THERAPIST: $403 to start, $426 after six months; raises to $503. Vacation, sick leave, other benefits. Work in all new, modern general hospital. Requires Calif. registration or eligibility for Calif. registration. Contact: Director of Personnel, Rm. 101, Hall of Records, Fresno, Calif.

Positions Available

PACIFIC (con't)

STAFF PHYSICAL THERAPIST for 155-bed general hospital. College community, 30 minutes from San Francisco. Write details of education, experience, and references to: Miss Shirley J. Kelly, Chief Physical Therapist, Alta Bates Community Hospital, Berkeley 5, Calif.

OPENING IN LONG BEACH, CALIF. Staff position, 200-bed hosp. Expanding to 300 beds. Starting salary $400 mo. Address replies to: Samuel Kossack, RPT, Physical Therapy Dept., Long Beach Community Hosp., 1720 Termino, Long Beach 4, Calif.

IMMEDIATE OPENINGS for 2 qualified male physical therapists. On the job training in applied proprioceptive neuromuscular facilitation and rehabilitation technics. Located on the beach front. Write Thomas L. Humphrey, RPT, Chief Administrative Physical Therapist, California Rehabilitation Center, 1 Pico Boulevard, Santa Monica, California.

WANTED PHYSICAL THERAPIST, registered female, for clinic of 15 doctors located on west coast. Good working conditions; salary open. Please state previous experience in letter of application. Write W. A. Drummond, Business Manager, Santa Barbara Medical Clinic, Santa Barbara, California.

PHYSICAL THERAPIST (FEMALE) Doctor's office. Hours 9:00-5:00. Salary open. Also openings for 2 hospital positions (therapy) in Seattle, Washington. Reply to Anders E. Sola, M.D., 120 Northgate Plaza, Seattle, Washington.

PHYSICAL THERAPIST: Must be registered or eligible for registration; starting salary is dependent on experience and will be between $392.00-$491.00, liberal benefits include paid vacations, holidays and sick leave; small Sierra foothills community 15 miles east of Porterville. Contact William A. Winn, M.D., Medical Director, Tulare-Kings Counties Hospital, Springville, California.

FULL-TIME REGISTERED PHYSICAL THERAPIST, male or female, for 88-bed general hospital. Salary open. Paid vacation, free health insurance, and other benefits. Apply Miss Hellen Snortland, Assistant Administrator, Chula Vista Community Hospital, P.O. Box 758, Chula Vista, California (8 miles south of San Diego).

ALASKA

PHYSICAL THERAPIST WANTED for new department in medical and surgical clinic. For information on employment conditions and salary, write AIR MAIL to: Theone N. Shine, R.N., Anchorage Medical and Surgical Clinic, 718 K Street, Anchorage, Alaska.

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Burdick

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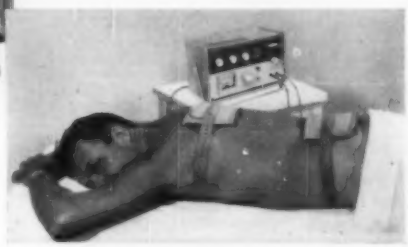

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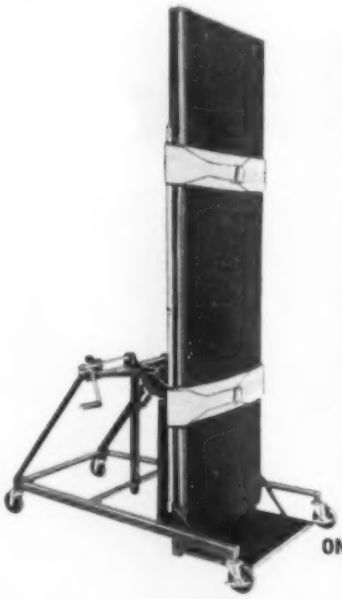

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